$^{40}Ar/^{39}Ar$ Dating of Detrital Muscovite and Sediment Compositional Analysis of the Pottsville Formation in the Black Warrior basin in Alabama: Implications for Tectonics and Sedimentation

By

Mitchell F. Moore

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Approved by

Willis Hames, Chair, Professor of Geology
Ashraf Uddin, Professor of Geology
Charles Savrda, Professor of Geology
and Dean, College of Science and Mathematics
Jack Pashin, Director, Energy Investigations Program:
Geological Survey of Alabama

Abstract

The Greater Black Warrior basin, including the Cahaba and Coosa synclinoria and the Black Warrior basin, contains the thickest preserved accumulation (ca. 2 km) of sediment in the Appalachian-Ouachita foreland. $^{40}Ar/^{39}Ar$ detrital muscovite ages, sandstone modal analysis, and conglomerate composition provide a powerful basis for delineating ancient depositional patterns, tectonic activity, and the provenance of ancient sediment. The Pennsylvanian Pottsville Formation was deposited in the Black Warrior basin between ca. 320 and 308.5 Ma, the latter age evidenced by dating of an ash layer in the upper Pottsville in Mississippi. Sandstones from the Cahaba synclinorium are compositionally immature and dominated by litharenite, with a mean composition of $Qt_{58}F_8L_{34}$ and $Qm_{51}F_8Lt_{39}$. Detrital muscovite modal ages of ca. 450, 375, and 325 Ma are recorded from the Cahaba, recording a dominant Appalachian source for metamorphic muscovite. The compositionally immature sediment and varied detrital geochronology indicate that sediment in the Cahaba synclinorium was deposited during rapidly changing tectonic regimes during Lower Pennsylvanian. Additionally, sediment from the Black Warrior basin varies in composition and detrital muscovite ages over various stratigraphic levels.

To investigate the character of sediment in the Black Warrior basin, samples were collected from surface exposures and from two cores in Alabama: (1) the Hendrix core,

located in a local depocenter of the basin containing more than 1 km of sediment from the upper Pottsville; and (2) the Brooks core, located in the central part of the basin and sampling 500 m of the lower Pottsville. Sandstones from the lower Pottsville are compositionally and texturally more mature than those of the upper Pottsville Formation. Conglomerates of the lower Pottsville Formation are dominated by quartz pebbles. In contrast, conglomerates in upper sections of the basin depocenter contain clasts similar to lithologies of the nearby Valley and Ridge, Piedmont and Blue Ridge provinces, consistent with a dominant local source for the upper Pottsville. Laser $^{40}Ar/^{39}Ar$ analyses for detrital muscovite from samples of the lower Pottsville (Brooks core) yield mainly Ordovician, Taconic ages of ca. 450 Ma, and a broad distribution of Devonian ages (ca. 390-360 Ma). Younger sandstones in the basin are dominated by Upper Mississippian to Lower Pennsylvanian muscovite (ca. 335-310 Ma). The compositional and geochronologic data are interpreted to indicate that large amounts of sediment were provided to the Black Warrior basin from Taconic terranes in the central and northern Appalachians during Lower Pennsylvanian. This interpretation requires that quartz arenites near the base of the Pottsville Formation were deposited by a Ganges-scale river system draining the central and northern Appalachians Mountains, while immature sediments (abundant in the upper Pottsville) were deposited by deltaic systems that drained the nearby southern Appalachians. Alleghanian structural development may have placed terranes containing abundant Acadian and Alleghanian muscovite in positions favorable to provide sediment to the sequences of the upper Pottsville Formation, while precluding accumulation of significant contribution of sediment from terranes with abundant Taconic muscovite.

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Nomenclature

BWB	Black Warrior Basin
Ga	Giga Annum (Billion years)
Ma	Mega Annum (Million years)
GBWB	Greater Black Warrior Basin
m.y.	Million years

Chapter 1 – Introduction

1.1 Orogenic Sedimentary Basins

Foreland basins are formed during collisional orogenies in response to crustal thickening and flexural subsidence of the Earth's crust. In these newly formed depressions, large amounts of sediment from the nearby uplifted mountain belts collect in thick sequences that record information about tectonics, depositional environments, and large-scale changes in the nearby orogenic region. The study of orogenic basins and their associated sedimentary systems has resolved large-scale tectonic problems in the Andes (Johnsson et al., 1991), Himalaya (Uddin and Lundberg, 1998, 2004; Goodbred and Kuehl, 2000), and the Appalachian foreland (Graham et al., 1975, 1976; Greb et al., 2008). For example, studies of the Bengal basin have shown that the eastern Himalayan region had not undergone large-scale uplift and tectonics until the Miocene, whereas the western Himalaya has undergone orogeny since the Eocene (Uddin and Lundberg, 1998, 2004). The timing and locations of the Appalachian orogenic episodes (Taconic, Acadian, and Alleghanian) are defined largely by the arrival of orogenic sediment and the creation of depressions by thrust and sediment loading in the Appalachian foreland (Quinlan and Beaumont, 1984; Beaumont et al., 1988; Figure 1).

1.1.1 The Black Warrior Basin

The Black Warrior basin (Figure 1) formed in the southern Appalachian foreland in response to the Mississippian-Pennsylvanian Alleghanian and Ouachita orogenies. Sedimentary sequences were deposited into the Black Warrior basin in a spectrum of marine through alluvial environments throughout its depositional history.

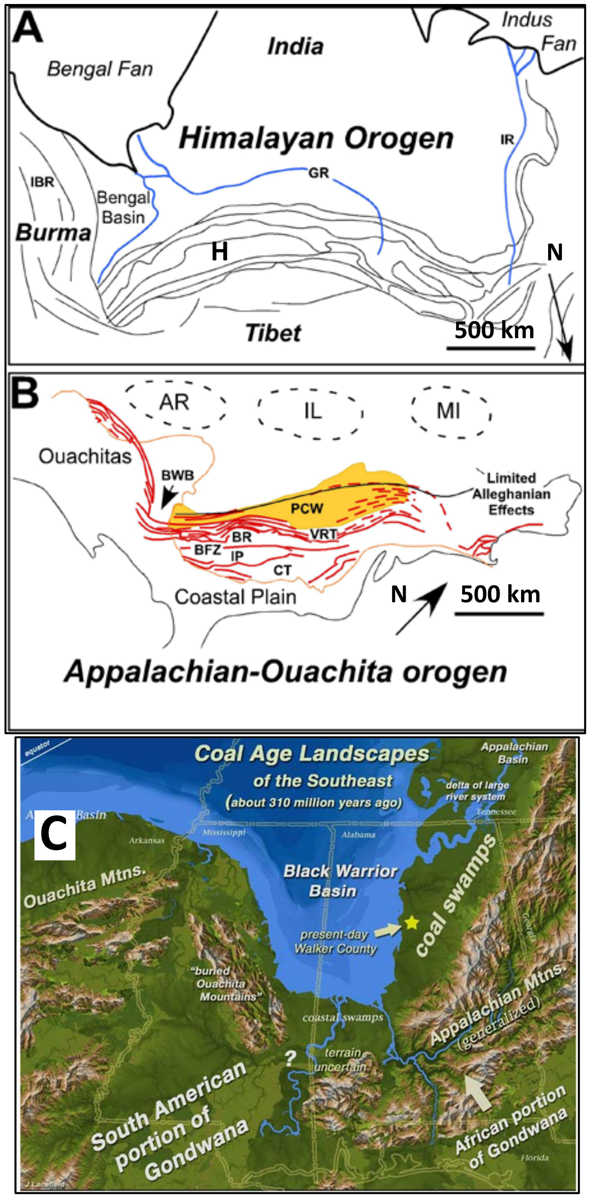

Figure 1. (A) The Bengal basin, which is located between the Himalayas (H) and Indo-Burman Ranges (IBR; figure adapted from Najman, 2006; note orientation of north arrow), is analogous to (B) the Black Warrior basin (BWB), which is located in the syntaxis between the Appalachian and Ouachita orogenic belts (figure adapted from Hatcher et al., 1989, and Milici and de Witt, 1989). Dashed oval regions in B indicate the location of the Arkoma (AR), Illinois (IL), and Michigan (MI) basins. The orange unit in this figure is the Pennsylvanian clastic wedge (PCW). (C) Paleoreconstruction of the environment of deposition for the BWB, where the approximate location of Walker County, AL is located by a yellow star (from Lacefield, in prep.). Additional abbreviations: GR, Ganges River; IR, Indus River; IBR, Indo-Burma Ranges; VRT, Valley and Ridge Terrane; BR: Blue Ridge; BFZ, Brevard Fault Zone; IP, Inner Piedmont; CT, Carolina Terrane.

The basin contains sediment derived from the western Ouachita Mountains and from the northern Appalachians early in its depositional history (Hatcher et al., 1989). This setting is analogous to the modern Bengal basin, which derives sediment from the Himalayan Mountains and Indo-Burma ranges. The Pottsville Formation is a Pennsylvanian stratigraphic unit of the Black Warrior basin that contains synorogenic clastic sediment deposited unconformably on top of Mississippian clastic and carbonate sediment in central Alabama and northeast Mississippi (Figure 2).

1.2 Appalachian-Ouachita Orogenesis

The Appalachian and Ouachita mountain ranges were the dominant sediment sources for the Paleozoic foreland basins of the eastern United States. The Ouachita mountain range was formed during Upper Devonian through Pennsylvanian in response to the collision of southern Laurentia (present-day North America) with a Gondwanan (South American) arc-trench system (Graham et al., 1975; Poole et al., 2005). This collision resulted in an orogen extending from modern-day Mississippi (Ouachita) through Sonora, Mexico and the formation of the Arkoma basin. Today, much of the deeply eroded Ouachita mountain range is buried beneath sedimentary strata of the Coastal Plain province.

The Appalachian orogenies have a more complex history, with multiple phases of ocean closure and opening, arc accretion and collisional events. The Appalachian orogeny comprises three major episodes: the Taconic (Ordovician-Silurian), Acadian (Devonian), and Alleghanian (Carboniferous) orogenies. These divisions have been recognized by the examination of widespread foreland basins formed cratonward from

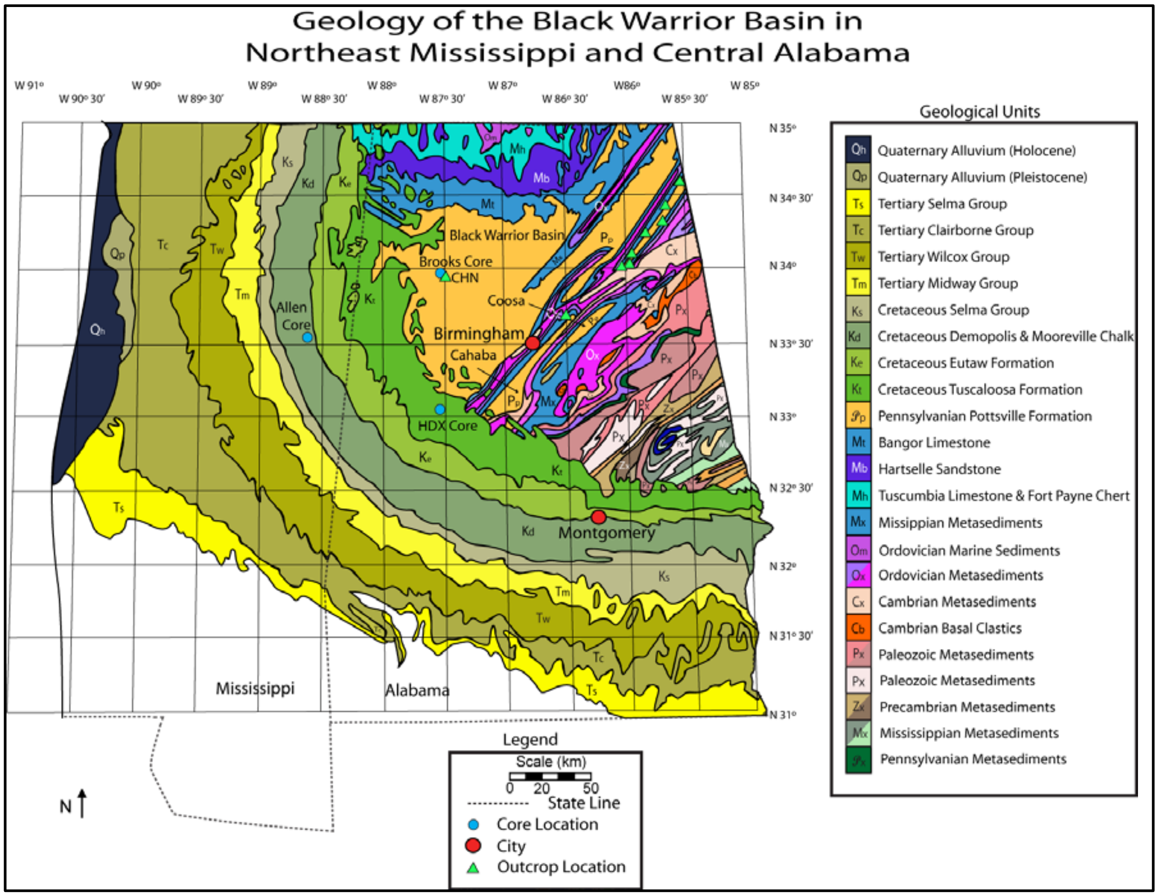

Figure 2. The Pennsylvanian Pottsville Formation (orange color) is exposed in much of the Black Warrior basin, and the Coosa and Cahaba synclinoria. The location of cores and outcrop samples used in this study are indicated by blue circles and green triangles, respectively. Map modified from the Geologic Map of the United States (USGS).

the Appalachian mountains. Additionally, geochronologic evidence from the metamorphic and igneous lithologies of the Appalachians supports the division of major terranes into these orogenic groups.

1.2.1 The Taconic Orogeny

The Taconic orogeny accomplished the accretion of volcanic arcs and associated terranes onto eastern Laurentia (Figure 3). The Appalachian foreland experienced large amounts of flexural subsidence in response to the Taconic orogeny from Middle Ordovician (470 Ma) through Lower Silurian (433 Ma). Large amounts of sediment (up to 6000 feet) were deposited in the foreland region of Pennsylvania, and in the back-bulge of the Michigan basin, during the Taconic orogeny (Beaumont et al., 1998).

During the Taconic orogeny, plutonism, high-grade metamorphism (up to granulite facies), subduction of oceanic crust, obduction and arc accretion occurred between ca. 455-470 Ma. Miller et al. (2006) documented ages of zircon, monazite, and rutile grains within plutons of the Eastern Blue Ridge in the southern Appalachians. They recognized metamorphic ages of ca. 455, 377, and 335 Ma, and interpreted these ages to indicate that tectonic activity associated with, respectively, the Taconic, Acadian, and Alleghanian orogenies were responsible for these three phases of plutonism in the Eastern Blue Ridge. Hatcher et al. (1989) interpret the Cowrock and Cartoogechaye, Piedmont, and Tugaloo terranes to be formed or accreted to the North American plate during the Taconic orogeny. Hibbard et al. (2000, 2012) included the docking of Carolinia with the Taconic orogeny (Figure 3D), as opposed to Hatcher et al. (2007), who placed the docking of the Carolina superterrane in the Acadian orogeny (Figure 3A).

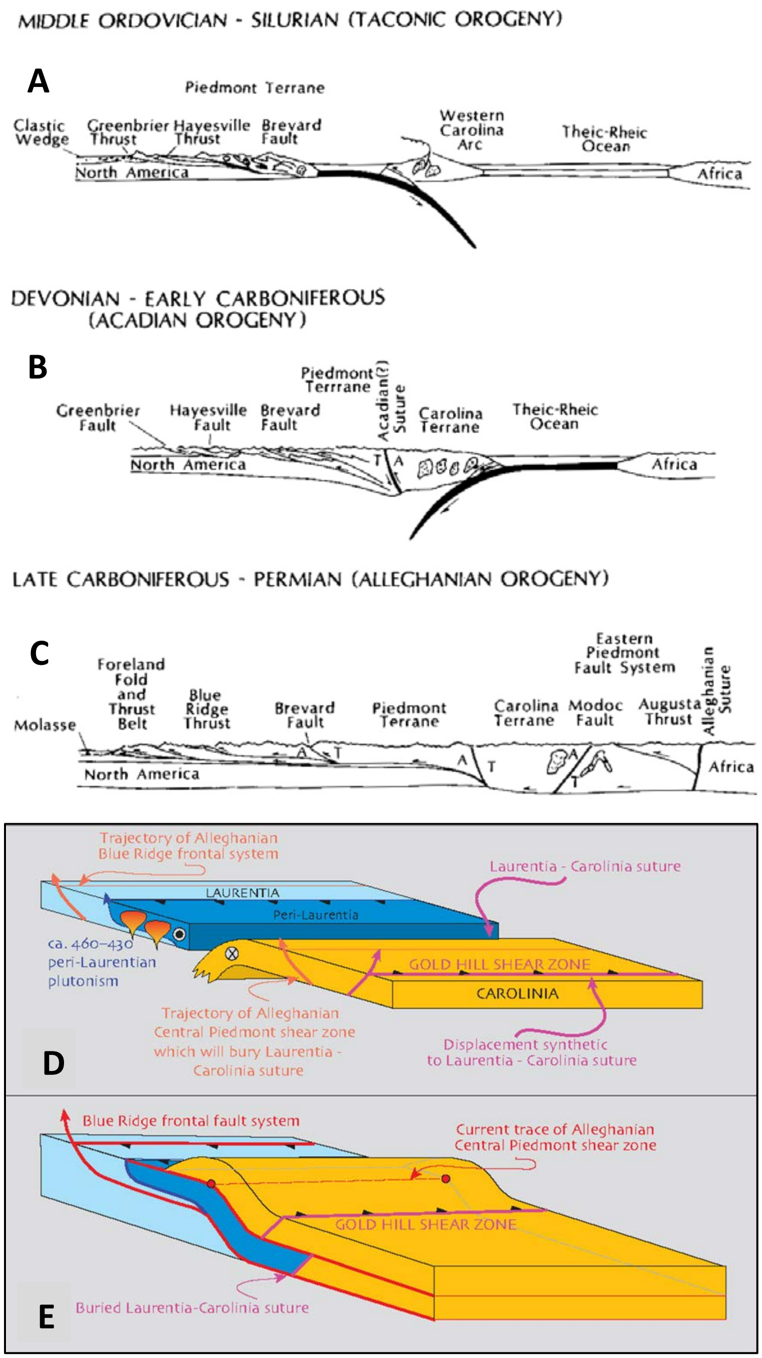

Figure 3. Tectonic models of the Appalachian orogenies from Hatcher et al. (1989; A-C) and Hibbard et al. (2012; D-E). Figures A-C show the Appalachian orogenies defined by Hatcher et al., including the docking of Carolinia in the Acadian orogeny. In contrast, Hibbard et al. interpret that Carolinia was accreted to Laurentia in the Taconic orogeny (D-E).

Corrie and Kohn (2007) found that the ages of metamorphic monazite inclusions in Barrovian garnet in the Western Blue Ridge (Great Smoky Mountain region) are ca. 445 Ma and record Taconic orogenesis. The Tugaloo, Cowrock and Cartoogechaye resemble ocean-arc assemblages with associated Taconic metasedimentary units (McSween and Hatcher, 1985; Ryan et al., 2005; Swanson et al., 2005).

1.2.2 The Acadian Orogeny

Sediment continued to accumulate on the Laurentian margin following Taconian terrane accretion. The Acadian orogeny developed through collisions between Laurentia and various arc terranes between ca. 400-360 Ma and was responsible for the formation of the Acadian foreland region, which includes the Michigan, Illinois, and Appalachian basins. Between Middle Devonian and earliest Mississippian (ca. 395-352 Ma), foreland subsidence was reactivated in the Taconian foreland basin and subsidence began in the Illinois basin. This renewed foreland subsidence is attributed to the Acadian orogeny when volcanic arcs accreted onto the Laurentian margin. Much of the Laurentian margin sediment was metamorphosed during the Acadian event (Hatcher et al., 2007).

According to some models, at approximately 400-360 Ma the Cat Square Terrane and Carolina Superterrane were accreted to eastern Laurentia (e.g., Hatcher et al., 2007; Figure 3C). However, Hibbard et al. (2012) interpret that Carolinia accreted to Laurentia in the Taconic orogeny, and was reactivated through transpressional tectonics during Upper Devonian to Mississippian (Figure 3D-E). Miller et al. (2006) document Acadian (ca. 377 Ma) plutonism in the Eastern Blue Ridge of the southern Appalachians, indicating tectonic activity in this region. Peak metamorphism and magmatism occurred throughout the Cat Square Terrane and the Carolina Superterrane with major episodes at ca. 400, 380, and 360 Ma (Hatcher et al., 2007).

Zircons from the Blue Ridge and Tugaloo terranes contain metamorphic rim ages of 360-350 Ma, and deformed 366 Ma plutons are evident in the Cat Square terrane (Carrigan et al., 2001; Thomas, 2001; Bream, 2003). Additionally, Miller et al. (2006) documented Acadian zircon and monazite ages (ca. 377 Ma) of plutons within the Eastern Blue Ridge in the southern Appalachians. The ages and relationship between these terranes suggest a 'Neo-Acadian' event at 380-350 Ma in the southern Appalachians, substantially younger than the Silurian to Lower Devonian Acadian event as originally recognized in the New England and Maritime Appalachians. The Acadian event is defined in the southern Appalachians by Devonian ages of metamorphic and igneous rocks, but a preserved and exposed clastic wedge is lacking in this area.

1.2.3 The Alleghanian orogeny

The Alleghanian orogeny consisted of the closing of the Iapetus Ocean, and collision between Laurentia and Gondwana, producing the supercontinent Pangea. In initial stages of collision (325-320 Ma), the terranes from previous orogenies were rapidly uplifted and eroded, providing detritus to large foreland basins from Pennsylvania to Alabama. Many of the orogenic terranes were originally formed and emplaced on the Laurentian margin ca. 350 km east of their present position prior to the culminating stages of the Alleghanian orogeny (Hatcher, 1989).

The Alleghanian orogeny finalized the formation of the Appalachian foreland basin during Mississippian to Permian. This orogeny included high-grade metamorphism and plutonism from ca. 320 to 290 Ma. During this collision, plutons formed in the Carolina Terrane, and the Blue Ridge-Piedmont megathrust sheet was activated. During the major thrusting events of the Alleghanian, these terranes were translated to their present position, and previously deposited sedimentary rocks were faulted, folded, and thrusted northwestward, creating the Valley and Ridge Province (Hatcher, 1989; Thomas, 2006; Hatcher et al., 2007). Deposition of the Pennsylvanian Pottsville Formation began during the initial Alleghanian events, and ceased before the final faulting and folding of the Valley and Ridge.

In summary, the extensive geochronologic work on major terranes in the southern Appalachians shows that all three major Appalachian orogenic events are reflected in the major terranes in the southern Appalachians. Metamorphic muscovite ages in the southern Appalachians, however, are overwhelmingly Alleghanian and Acadian. For example, Hames et al. (2007) found that metamorphic muscovite in the western Blue Ridge and Talladega belt are dominated by Alleghanian and Acadian ages (ca. 320-335 Ma). Additionally, Hibbard et al. (2012) document the presence of Taconian, Alleghanian, and Acadian muscovite ages (ca. 440-450, 350-380, and 320-330 Ma) in the Carolina Superterrane. Although these terranes may have initially formed during the Taconic and Acadian orogenic events, they experienced widespread, overprinting Alleghanian metamorphism, and detrital muscovite derived from these regions can be expected to have a prominent Alleghanian age signature.

1.2.4 Ouachita Orogeny

The Ouachita orogenic belt shares some aspects of history with the Appalachian orogeny, but is thought to record mostly Upper Devonian to Carboniferous events. Rifting of the Laurentian craton began during Upper Precambrian to Cambrian along the margin presently occupied by the Appalachian-Ouachita belt (Viele and Thomas, 1989). After the onset of rifting, Paleozoic sediments were deposited on the craton and on the oceanic crust to the south of the Laurentian margin. Ethington et al. (1989) described the pre-orogenic strata of the Ouachita orogenic belt as consisting of mostly fossiliferous deep-water sediments. During Lower Mississippian, as the Iapetus Ocean began to close, the oceanic crust of the North American plate subducted beneath the approaching South American plate. This created an accretionary wedge of Ouachita sediments. As subduction evolved to collision, the accretionary wedge was thrusted onto the southern margin of the North American craton, finalizing the closing of the ocean between the North and South American plates (Viele and Thomas, 1989).

Synorogenic clastic deposits are abundant in the Black Warrior and Arkoma basins. The onset of Ouachita orogenesis is defined by the change from slowly deposited chert and silicious shale to rapidly deposited clastic sediment (Viele and Thomas, 1989). In the Black Warrior basin, clastic deposits sourced from the Ouachitas comprise a northeastward-prograding delta sequence (formations including Floyd-Pride Mountain, Hartselle, and Parkwood; Mack et al., 1983).

There are few isotopic age constraints on the timing of peak metamorphism for the Ouachita orogenic event. Bulk K-Ar analysis of various igneous and metamorphic rocks in the Ouachita region yielded ages of 313-324 Ma and 358-378 Ma (Denison et al., 1977). However, as will be discussed later, bulk K-Ar analyses are not reliable indicators for constraining tectonic activity.

1.3 Formation of the Black Warrior basin and Pre-Pottsville Stratigraphy

The Carboniferous basin of the southern Appalachian foreland (Figure 4) is largely located in the syntaxis between the Ouachita and Appalachian Mountains (northwest Alabama, Mississippi, Georgia, and Tennessee). During the thrusting events of the Alleghanian orogeny, the Greater Black Warrior basin experienced folding, thrusting, and separation into various structural basins, including the Black Warrior basin, Cahaba synclinorium, and Coosa synclinorium. The Black Warrior basin was initially formed largely by flexural subsidence associated with the Ouachita orogeny (Thomas, 1976, 1995), and a large amount of sediment, now represented by the Parkwood Formation, was deposited during the Mississippian in northeastward-prograding clastic wedges (Thomas, 1972b; Thomas and Mack, 1982). Through the Pennsylvanian, subsidence in the Black Warrior basin increased to the southeast in response to the Alleghanian orogeny (Pashin, 2004).

Carbonate and clastic sediment accumulated from the Mississippian through the Pennsylvanian, causing approximately half of the subsidence of the Black Warrior basin (Pashin, 2004). Since the peak of deposition during Pennsylvanian, it has been estimated that 1.2-2.5 km of sediment has been eroded away from the Black Warrior basin (Pashin, 2004). During Mississippian highstand, thick successions of carbonate sediment accumulated onto the interior Laurentian craton, as exemplified by

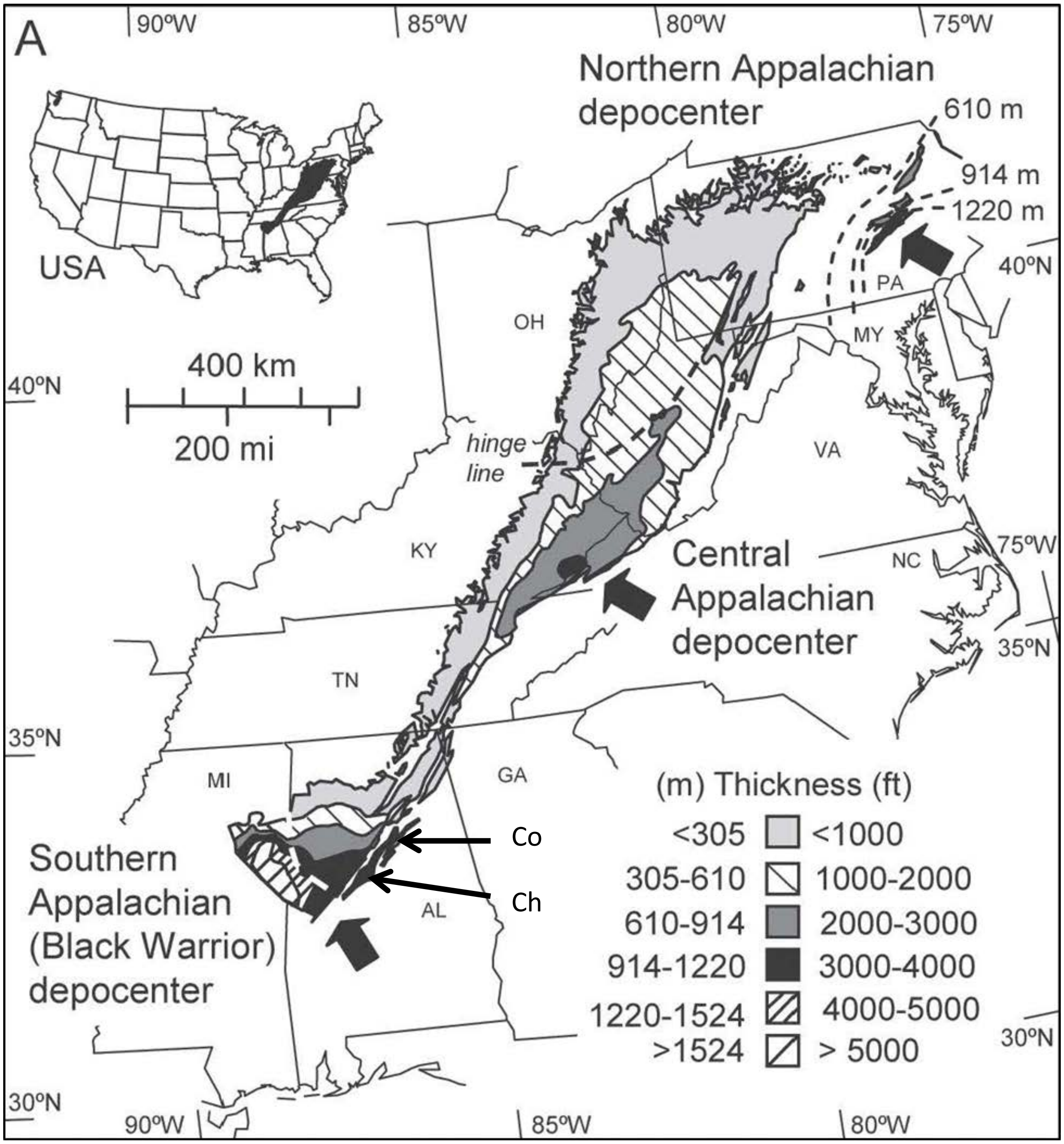

Figure 4. Isopach map of the Appalachian foreland basin from Greb et al. (2008). Note the location of 3 separate depocenters, which are the locations of maximum sediment accumulation and subsidence. The greatest thickness of sediment is seen in the Southern Appalachian (Black Warrior) depocenter. The Cahaba (Ch) and Coosa (Co) synclinoria are separate basins to the east of the Southern Appalachian depocenter.

the Bangor Limestone in the Black Warrior basin. Though deposition was slow, the Bangor Limestone is at least 250 feet thick in the study region, and thickens to the southwest due to flexural subsidence of the Ouachita Mountains (Pashin, 1993). During lowstand, clastic facies were deposited in the Black Warrior basin.

In the southwest portion of the basin, carbonate deposits were rapidly succeeded by a prograding clastic deltaic sequence derived from the southwest during the Upper Mississippian (Pashin, 1993). This deltaic sequence, referred to as the Parkwood delta, grades from sand-dominated in the southwest to mudrock-dominated in the northeast. In the Brooks core (described in subsequent sections of this work) the Parkwood is represented by ~100 feet of sand beneath the Pottsville Formation. An unconformity, representing the Mississippian-Pennsylvanian boundary, separates the Parkwood Formation from the overlying Pottsville (Pashin, 1993), though this boundary is unclear in other parts of the basin.

The erosional contact between the Parkwood and the overlying Pottsville Formation can be correlated to the basal contact of the Pottsville Formation in the northern Appalachians with a depositional age, determined by dating ash beds in the lower Pottsville, to be slightly older than ca. 316 Ma (Lyons et al., 1997; Outerbridge and Lyons, 2006). Studies show that deposition of the Pottsville continued until ca. 308 Ma (Greb et al., 2008) in the northern Appalachian foreland basin. This agrees with the age of an ash layer with an age of 308 Ma found in and upper stratigraphic section of the Black Warrior basin in Mississippi (Allen Core, Figure 2; Uddin et al., 2010, and Uddin et al., in prep.). This age is considered to represent a maximum age of deposition for the Pottsville Formation for the purposes of the present study.

There has been a considerable debate about the source of clastic material in the Black Warrior basin. A majority of workers in the Black Warrior basin suggest a northern source of sediment from the craton or the northern Appalachians. Following the slow deposition of carbonate rocks, mature sands were deposited on the northern flank of the basin prograding into deeper waters to the south (Cleaves, 1983; Cleaves and Bat, 1988; Stapor and Cleaves, 1992). Welch (1958) described the Upper Mississippian clastic sediment in the Black Warrior basin as largely deposited by a 'birdfoot delta'. Thomas has interpreted the stratigraphy of the upper Mississippian-lower Pennsylvanian sequences to be derived from the southwest (Thomas, 1972a, 1995). Additionally, Thomas (1988) provided a stratigraphic correlation of well logs throughout the Black Warrior basin with the interpretation that the Pottsville Formation source was to the southwest. Comparisons of sandstone composition indicate that the Pennsylvanian Pottsville and upper Mississippian Parkwood were possibly derived from the same depositional system (Thomas and Mack, 1982; Mack and Thomas, 1983).

1.4 Pottsville Formation Stratigraphy

The Pottsville Formation of Alabama was deposited in response to the Pennsylvanian Alleghanian orogeny. Sedimentary, igneous, and metamorphic rocks associated with previous orogenies were uplifted and eroded, which resulted in the delivery of large volumes of sediment to the Black Warrior basin. Sediments were deposited in various continental and marine settings. In Alabama and Mississippi, the

Pottsville Formation is dominated by interbedded shale, sandstone, conglomerate, coal, and mudstone (e.g., Pashin and Groshong, 1998, Pashin and Gastaldo, 2004; and Pashin, 2005, 2008). The Pottsville Formation is presently exposed in the Black Warrior basin, in the Coosa and Cahaba synclinoria, and other areas of the Valley and Ridge province. Although deposited in a single, contiguous basin, Pottsville strata in these regions were separated by subsequent faulting and folding of the Valley and Ridge.

The stratigraphy of the Pottsville Formation in the Black Warrior basin and the Cahaba and Coosa synclinoria has been examined in detail (Pashin et al., 2005; Figure 5). The stratigraphic column in Figure 5 shows that, although the Cahaba and Coosa synclinoria were originally part of the Greater Black Warrior basin, the stratigraphy varies greatly between each subsidiary basin. One major difference between the Cahaba synclinorium and Black Warrior basin is the distribution of marine zones. In the Cahaba synclinorium, the abundance of marine zones decreases up section, while in the Black Warrior basin there is no vertical trend in the percentage of marine strata. The Coosa synclinorium differs from the Cahaba synclinorium in that it lacks significant conglomerates and contains an additional sequence with conspicuous red mudstone, called the redbed measures (Pashin, 2005).

There are broad similarities between the subsidiary basins as well. The lower Pottsville of the Black Warrior basin is dominated by a thick quartzarenite unit similar to the quartzarenite measures in the Cahaba synclinorium. The upper Pottsville of the Black Warrior basin is similar to the mudstone measures of the Cahaba and Coosa synclinoria, containing cyclic fluvial-deltaic deposits that record glacioeustacy. As sea level rose and fell during the Pennsylvanian, coastlines migrated throughout the Black

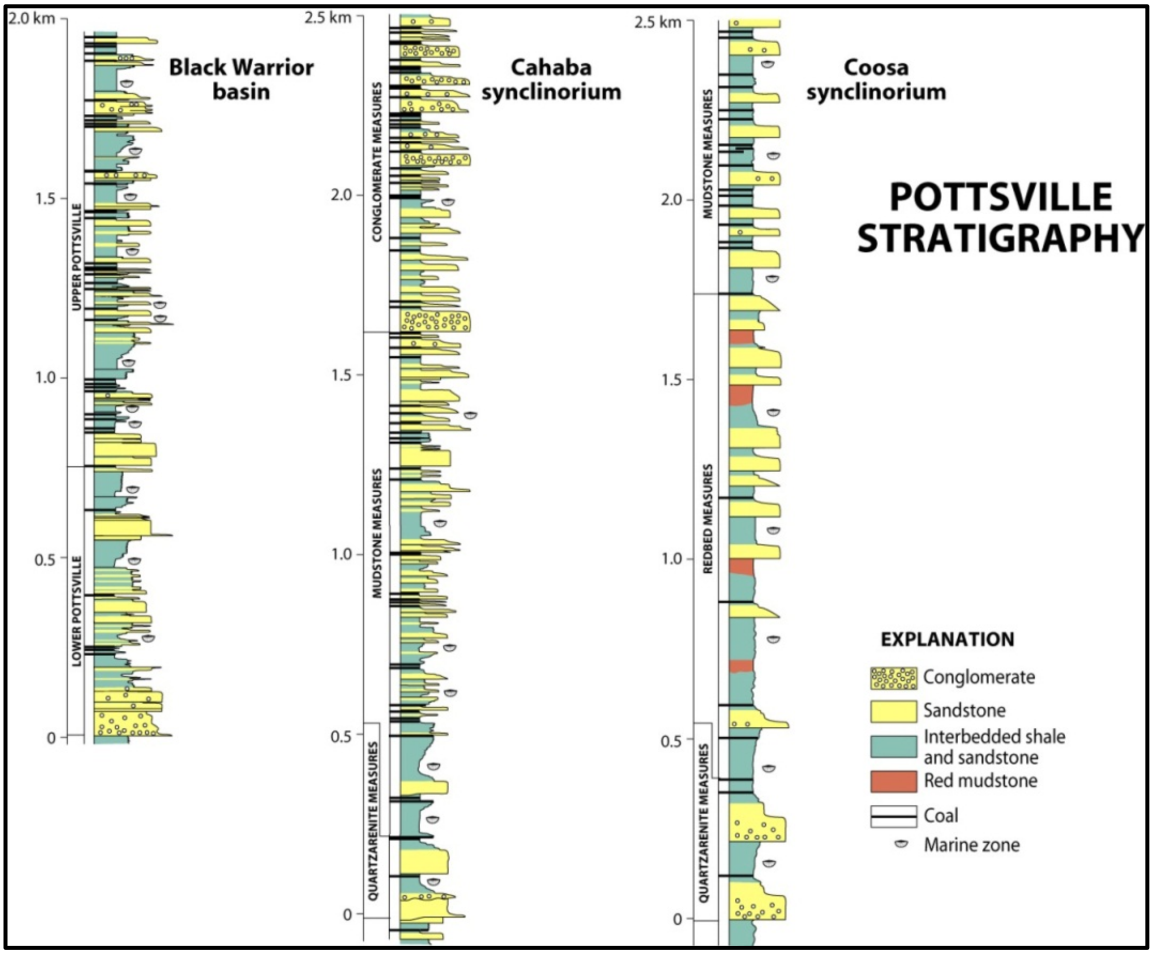

Figure 5. The stratigraphy of the Greater Black Warrior basin (from Pashin and Gastaldo, 2009) varies greatly among subsidiary basins. Marine zones are abundant in the higher sequences in the Black Warrior basin and in the lower sequences in the Cahaba synclinorium. The Pottsville in the Cahaba and Coosa synclinoria is approximately 500 meters thicker than in the Black Warrior basin, reflecting proximity to the nearby Appalachian Mountains.

Warrior basin, resulting in common vertical and lateral variations within the Pottsville Formation (Pashin, 2004 and references therein).

1.5 Structural and Depositional Dynamics of the Black Warrior basin during the Pennsylvanian

The Greater Black Warrior basin experienced folding and faulting associated with the Alleghanian-Ouachitan orogeny during and after deposition of the Pottsville Formation. The Black Warrior basin and Cahaba synclinorium are now separated by the Birmingham anticlinorium. The anticlinorium is the location of the leading edge of the basal thin-skinned detachment sheet of the Appalachian Fold and Thrust belt (including the sedimentary sequences of the Pottsville Formation of the Cahaba synclinorium). Thomas (2007) interpreted the outcropping detachment sheet to be related to the Birmingham basement graben. The Birmingham graben was formed by faulting during rifting of the Iapetan margin, and the Birmingham basement fault reactivated during the Mississippian Alleghanian and Ouachita orogenies. This led to increased sediment accumulation in the downthrown side of the fault (to the southeast). In addition to the subsidence of the Black Warrior basin due to the basement-graben subsidence, basin subsidence increased during the deposition of the Pottsville Formation to the southeast (Pashin, 2004; Greb et al., 2008; Figure 6). All of these factors led to a complex and dynamically subsiding foreland basin in the southern Appalachians.

Dynamic depositional environments add to the complexity of the Black Warrior basin. Studies show that sandstones in the Black Warrior and the Ouachita areas are broadly similar and were deposited concurrently (Graham et al., 1976). The sandstones

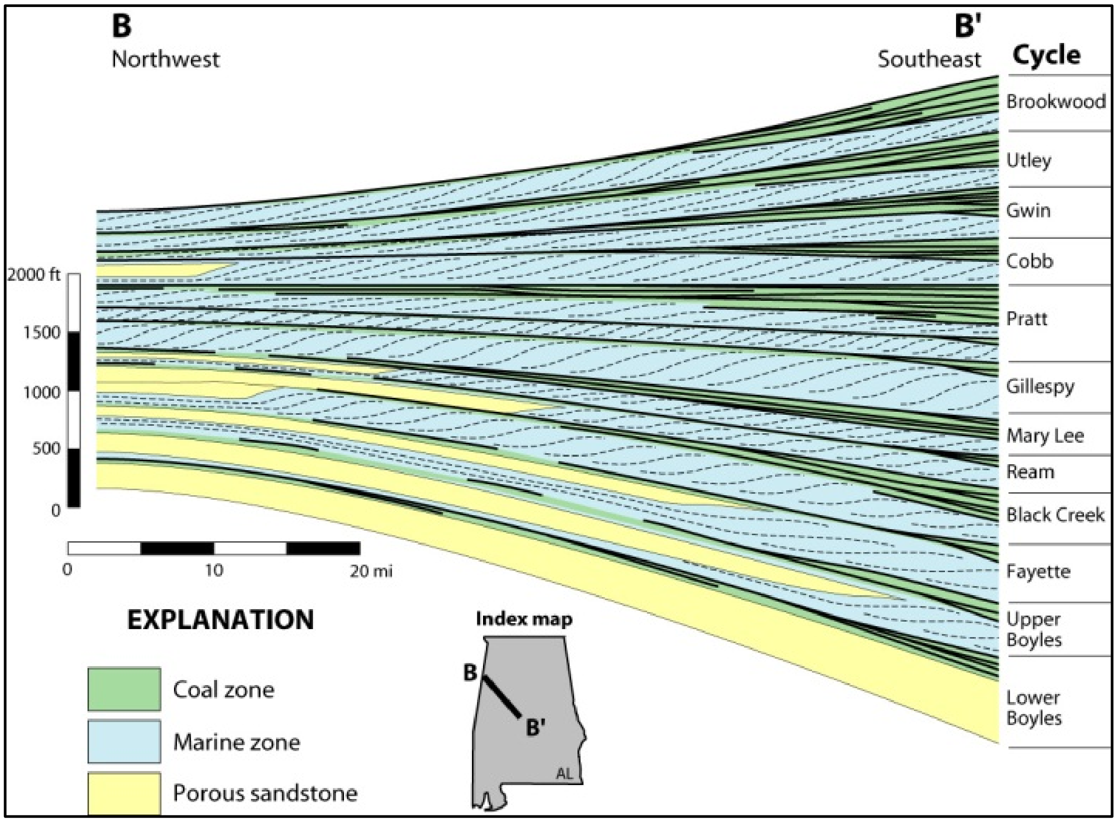

Figure 6. The Pottsville Formation in the Black Warrior basin thickens to the southeast. The Pottsville is divided into major coal-bearing units or cycles as shown in the right of the figure. Note the location of porous sandstone units, which are referred to in this study as quartz arenites (Pashin, 1994).

of the Pottsville Formation, however, are texturally immature and contain more lithic fragments and polycrystalline quartz than the sandstones from the Ouachitas. Some authors have suggested that sediment deposited at the base of the Lower Pennsylvanian is genetically related to a large river system deriving sediment from the entire Appalachian orogen, including terranes from as far as the Maritime Provinces of Canada (Archer and Greb, 1995; Figure 7). Throughout the Appalachian foreland, this proposed river system eroded the underlying Mississippian strata, creating incised valleys, and later deposited quartz arenite conglomeratic sandstones such as the Lee sandstones, the Bloyd Sandstone, and the Livingston Conglomerate. These observations and interpretations are based on sandstones from the Central Appalachian basin in Kentucky and the Eastern Interior basin in Illinois (Archer and Greb, 1995), and may be related to the depositional system inferred as the source of the Mississippian clastic material in the Black Warrior basin.

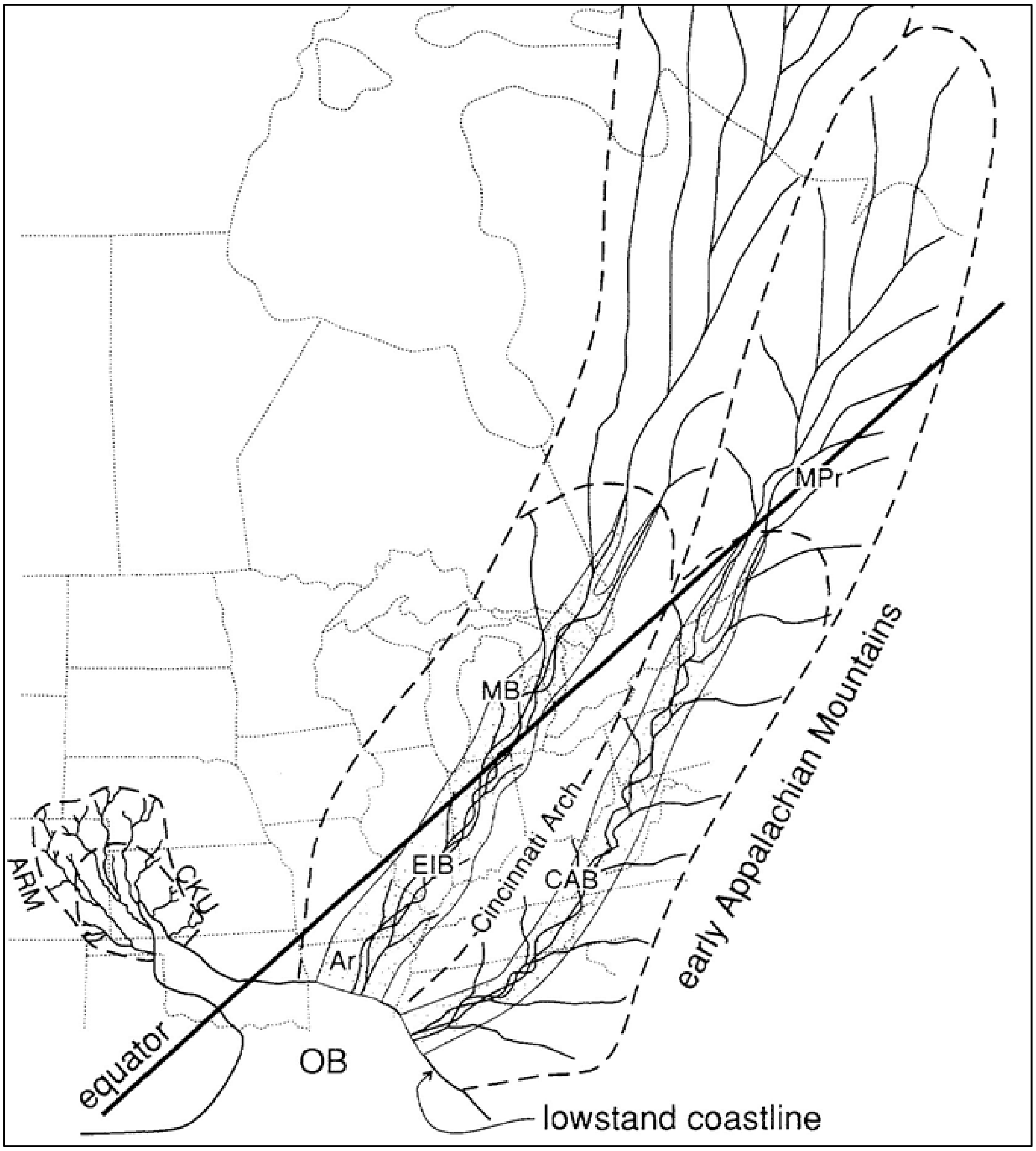

Figure 7. Archer and Greb (2005) infer the existence of an ancient Pennsylvanian river system with drainage patterns preserved by basal sandstones deposited in incised valleys. This diagram shows the location of two major Pennsylvanian river systems inferred in that study with scales similar to the modern Amazon and Ganges rivers. One of the systems traverses the Central Appalachian Basin (CAB) and the Black Warrior basin (not labeled here). Additional symbols: OB = Ocean basin; Ar = Arkoma basin; EIB = Eastern Interior basin; MB = Michigan basin; MPr = Maritime Province. Note that the lowstand coastline is shown here at the location of the future Ouachita Mountain belt, and this coastline would have migrated northeastward through the Appalachian foreland during higher sea-level stands.

Chapter 2 – Rationale and Strategy for the Present Study

2.1 Plutonic and Stratigraphic Perspectives in studies of Mountain belts

Much of the Ouachita belt is buried underneath Mesozoic-Cenozoic strata of the Gulf of Mexico Coastal Plain and the Mississippi Embayment, and a considerable amount of the original orogen has been removed through erosion. The plutonic rocks of the Appalachian Mountains that crop out today represent deep crustal elements of the ancient Appalachians. Deposition of the Pottsville Formation began at the onset of the Alleghanian-Ouachita orogeny. The detritus preserved in the Pottsville Formation of the Black Warrior basin reflects the types of rocks exposed in the mountain belts at ca. 320 Ma, before widespread erosion removed much of the Appalachian and Ouachita material. Thus, the present study focuses on the detrital record of the Appalachian-Ouachita orogeny as a means to refine the record of major tectonic events, depositional cycles, and major metamorphic events in the region.

2.2 Core Analysis

This study focused on the analysis of the Pottsville Formation as represented in cores. There are abundant cores available for study in Alabama due to coal and hydrocarbon exploration. Two cores housed at the Geological Survey of Alabama were selected as a focus for this study: (1) the Hendrix core, which was drilled in a local depocenter of the Black Warrior basin and sampled more than 1200 m of the upper Pottsville; and (2) the Brooks core, which was drilled in the center of the basin and sampled ca. 500 m of the lower Pottsville and its basal contact with the Parkwood Formation. Studies of these cores included characterizing Pottsville stratigraphy, modal mineralogy point counting, petrographic textural analysis, and $^{40}Ar/^{39}Ar$ dating of detrital muscovite.

2.3 $^{40}Ar/^{39}Ar$ Dating of Detrital Muscovite

In addition to the other work, this study focused on dating detrital muscovite in the Pottsville Formation by single crystal $^{40}Ar/^{39}Ar$ analysis. Detrital geochronology has been utilized to identify major source terranes using a variety of minerals. Considering its closure temperature of ca. 350-400 °C (e.g., Hodges, 1991), muscovite is amenable to record a range of low to high-grade metamorphic conditions in various orogenic settings, particularly those where K-Al rich metasedimentary and metamorphic rocks are abundant. These are abundant in collisional orogens such as the Appalachians and Ouachitas. Thus, dating detrital muscovite is an ideal way to determine the character of the Black Warrior basin's sources.

Chapter 3 – Previous Work

3.1 Sandstone Composition

Sandstone composition and texture have been used to determine the source area and transport of material in sedimentary studies. Dickinson et al. (1985) discussed the use of modal mineralogy to determine the type of source terranes for sandstones. This method includes point counting thin sections of sandstone and counting grains at consistent sampling intervals. Grains are identified as monocrystalline and polycrystalline quartz, plagioclase and potassium feldspar, volcanic, sedimentary, and metamorphic lithic fragments, and other grain types. Dickinson et al. (1985) found that sands of similar source character have similar composition when plotted on QtFL and QmFLt ternary diagrams. QtFL diagrams focus on the mineralogical inheritance of sandstones, while the QmFLt diagram focuses more on textural maturity of sediments.

In addition to modal mineralogy, textural analysis can indicate characteristics of the environment of deposition for sandstones. The texture of sediment is dependent on rates of weathering, erosion, and transport time, as well as the transportation mechanism and settling velocities of individual grains. Since the Black Warrior basin was near the equator during Pennsylvanian, rates of chemical weathering were very high during the deposition of the Pottsville Formation. This promoted increased sediment maturity with duration of erosion and transport between the source (Appalachian Mountains) and sink (Black Warrior basin).

During Lower Pennsylvanian, eastern Laurussia experienced lowstand conditions and Mississippian sediments were subaerially exposed. A large river system, perhaps as big as the modern Amazon and Ganges Rivers, cut across these Mississippian sediments, creating incised valleys (some as deep as 120 m, and as wide as 30 km) to the west of the major foreland basins (Archer and Greb, 1995). These incised valleys were later filled with Pennsylvanian sediment during highstand (e.g., the Lee Formation of Tennessee and the Bloyd Sandstone of Arkansas; Archer and Greb, 1995). Archer and Greb suggest that this system was vast, draining the northern Appalachians and depositing sediment in modern day Alabama-Mississippi at the paleocoastline. This is in agreement with Hatcher et al. (1989; and references therein) who suggested that sediment that reached Alabama during the lower Pennsylvanian was likely sourced from the northeast.

Graham et al. (1975) modeled sediment dispersal patterns in the Black Warrior basin after the modern Bengal basin system. In the Bengal basin, sediment dispersal has followed a closing-zipper pattern between the Himalaya and Indo-Burma ranges. Graham et al. (1975) deduced that sediment dispersal in the Black Warrior basin likely followed a similar pattern, as the Southern Appalachian and Ouachita mountain ranges closed in on each other during the collisional events of the Alleghanian orogen. This conclusion was supported by additional work (Graham et al., 1976; Mack et al., 1983), indicating that sandstones of the Black Warrior basin and the Ouachitas have similar compositions, and thus were likely sourced from the same terrane.

Recent studies of the Pottsville Formation in the Cahaba synclinorium have shown that the sandstones in that location are texturally and compositionally immature with an average composition of $Qt_{58}F_{8}L_{34}$ and $Qm_{51}F_{9}Lt_{39}$ (Peavy, 2008). The immaturity of sediment in the Cahaba synclinorium indicates that it was deposited very close to the source. Peavy (2008) interpreted her results to indicate that the Pottsville

Formation in the Cahaba synclinorium was likely sourced from the southern or northern Appalachians, as opposed to the Ouachita Mountains to the southwest.

3.2 Conglomerate Characterization

Units that contain preserved conglomerate layers are highly valuable for determining source materials. Conglomerate clasts typically are small pieces of the source rock, as opposed to individual mineral grains. In many cases, conglomerate units preserve many of the textures and components of the source rock. Analysis of conglomerates can provide a clearer picture of ancient depositional environments and drainage patterns.

The majority of the conglomerates from the base of the Pottsville Formation are composed largely of quartzose granules. The Sharon conglomerate in the northern Appalachian foreland region is a basal Pottsville unit containing largely quartzose pebbles. These quartzose pebbles include vein quartz, chert, sandstone, metaquartzite and less common low- to medium-grade metamorphic clasts (phyllite, schist, and slate; Meckel 1967; Mrakovich and Coogan, 1974). The Sharon Conglomerate fills many paleovalleys that were incised into the underlying Mississippian units. This conglomerate unit was interpreted (Mrakovich and Coogan, 1974) to be deposited in a river system similar to the one described by Archer and Greb (1995).

In the Black Warrior basin, conglomerates are abundant in the upper sequences of the Cahaba synclinorium, thus the division into the *conglomerate measures* of the upper Cahaba sequences (Pashin et al., 1995). The Mary Lee Coal zone in Walker County, AL contains conglomerates with dispersed coalified logs (Gastaldo et al., 1993). Steltenpohl et al. dated minerals from igneous and metamorphic cobbles in a conglomerate of the Mary Lee coal zone and separated muscovite with an age of ca. 447 Ma, representative of a Upper Ordovician, Taconic granite (Steltenpohl et al., 2005).

3.3 Detrital Geochronology

Detrital geochronology has taken a premier role in determining sediment provenance. Sediments contain a variety of minerals with radioactive isotopes in them, such as muscovite, zircon, apatite and others. These minerals can be dated to determine the age of metamorphism or mineral growth in sediment source terranes.

Muscovite, which is the mineral of focus in this study, contains the radioactive element potassium (K). Because potassium decays into argon at a constant rate, muscovite can be analyzed using the $^{40}Ar/^{39}Ar$ technique (described in detail later) to determine the age of an individual crystal. Muscovite K/Ar ages are generally considered to represent the timing of crystal growth in rocks formed at low metamorphic temperatures, or that cooled quickly. In higher grade metamorphic and igneous rocks that cooled slowly, muscovite ages typically represent the retention of argon at the mineral's closure temperature, often stated at ca. 350-400 °C depending on grain size and cooling rate (e.g., Hodges, 1991). Several studies have established that ranges in age can exist among muscovite crystals from a single rock, due to variations in grain size and also growth during superimposed events (e.g., Hames and Cheney, 1997; Hames et al., 2008). In sedimentary rocks, detrital geochronology determines the age of selected grains in the source region, not the age of the sediment itself. Detrital mineral ages can constrain the maximum age of deposition, though there will be lag time between mineral formation and final deposition (Hodges et al., 2005; Brewer et al, 2006; Uddin et al., 2010). With these properties of detrital muscovite geochronology in mind, many recent studies have utilized ages of detrital muscovite to characterize the ages of source material and unroofing and cooling histories. For example, Brewer and Burbank (2006) performed a detrital geochronology study documenting changes in detrital muscovite age signature in the Marsyandi drainage system of Nepal. In their study, the age distribution of detrital muscovite became increasing complex downstream, as river tributaries contributed an increasing variety of source materials to the larger river system. This study provided a framework in which to interpret detrital geochronology data from ancient systems. White et al. (2002) demonstrated the ability of muscovite to constrain the age of deposition in Himalayan basins. Additionally, the evolution of the age of metamorphic minerals over time can constrain the cooling history of the hinterland region (Najman, 2006), as well as the timing of major tectonic events.

Until recently, work done in the Appalachian foreland has been largely restricted to U/Pb dates of detrital zircons and a few studies that relied on bulk sample K/Ar dating of muscovite. Detrital zircons from the base of the Pottsville Formation were analyzed using U/Pb geochronology by Becker et al. (2005; Figure 8). Two samples from the Pottsville Formation contained abundant zircons with ages greater than 850 Ma (and only a few zircons with Paleozoic ages), and were interpreted to principally reflect zircons that originally formed during the Grenville event with some zircons derived from Taconic arc lithologies. A sample from the Cahaba synclinorium was found to have zircons with ages greater than 931 Ma, interpreted to be associated with the Grenville orogeny. No zircon

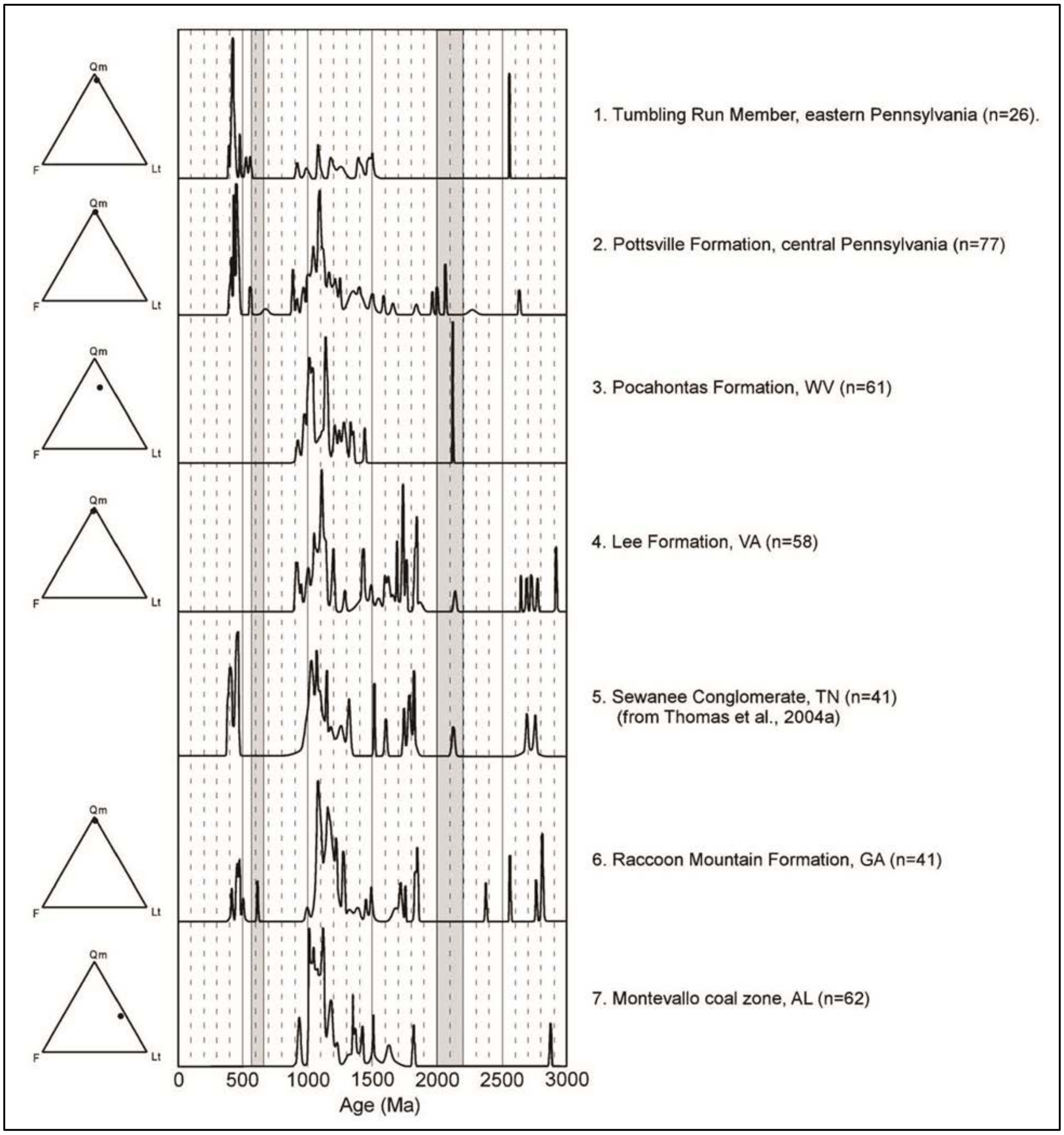

Figure 8. Detrital zircons age distributions for Carboniferous sandstones of the eastern United States (from Becker et al. 2005). This shows the limited ability of zircons to define Appalachian orogenic events in the basal Pennsylvanian sandstones. Sample 7 in this figure is from the Cahaba synclinorium; note the complete absence of an Appalachian orogenic signal. Gray bars indicate ages typical of Gondwanan crust.

ages less than 931 Ma were found in the sample from the Cahaba Basin (Becker et al., 2005). These data and interpretations demonstrate limited ability to resolve Appalachian events with U/Pb detrital zircon geochronology.

Noting the results of Becker et al. (2005), Hietpas et al. (2010) recognized the propensity for zircons to record older, higher-grade metamorphic events (and/or mineral growth), and used *in situ* U-Th/Pb dating methods to analyze rims of detrital zircons and monazite from modern sediments of the French Broad River in North Carolina and Tennessee. Monazite grains from the French Broad River yield Appalachian ages spanning much of the Paleozoic history of the southern Appalachians (Figure 9A). Monazite grains from tributaries record only Taconic tectonism (ca. 460 Ma; Figure 9B). Zircon cores record largely Grenville ages (ca. 1000-1300 Ma), while zircon rims yielded improved resolution of Taconic ages (ca. 400-500 Ma; Figure 9C). The work of Hietpas et al. (2010) demonstrates an increased ability for U-Th/Pb ages of zircon rims and monazite to record Appalachian orogenic events.

Aronson and Lewis (1994) analyzed twelve samples of sediment from the northeast Appalachian Basin (in Ohio) using standard K/Ar analysis of bulk muscovite separates. Ten out of their twelve analyzed samples (from the Catskill wedge, the Mauch Chunk and Pottsville Formations, and Allegheny group) yielded ages that ranged from 406-371 Ma. With a lack of ages younger than 350 Ma or older than 410 Ma, Aronson and Lewis (1994) concluded that Acadian age rocks dominated the sediment supply for the Catskill clastic wedge, the Mauch Chunk and Pottsville Formations, and the Allegheny group. As acknowledged by Aronson and Lewis (1994), their interpretations

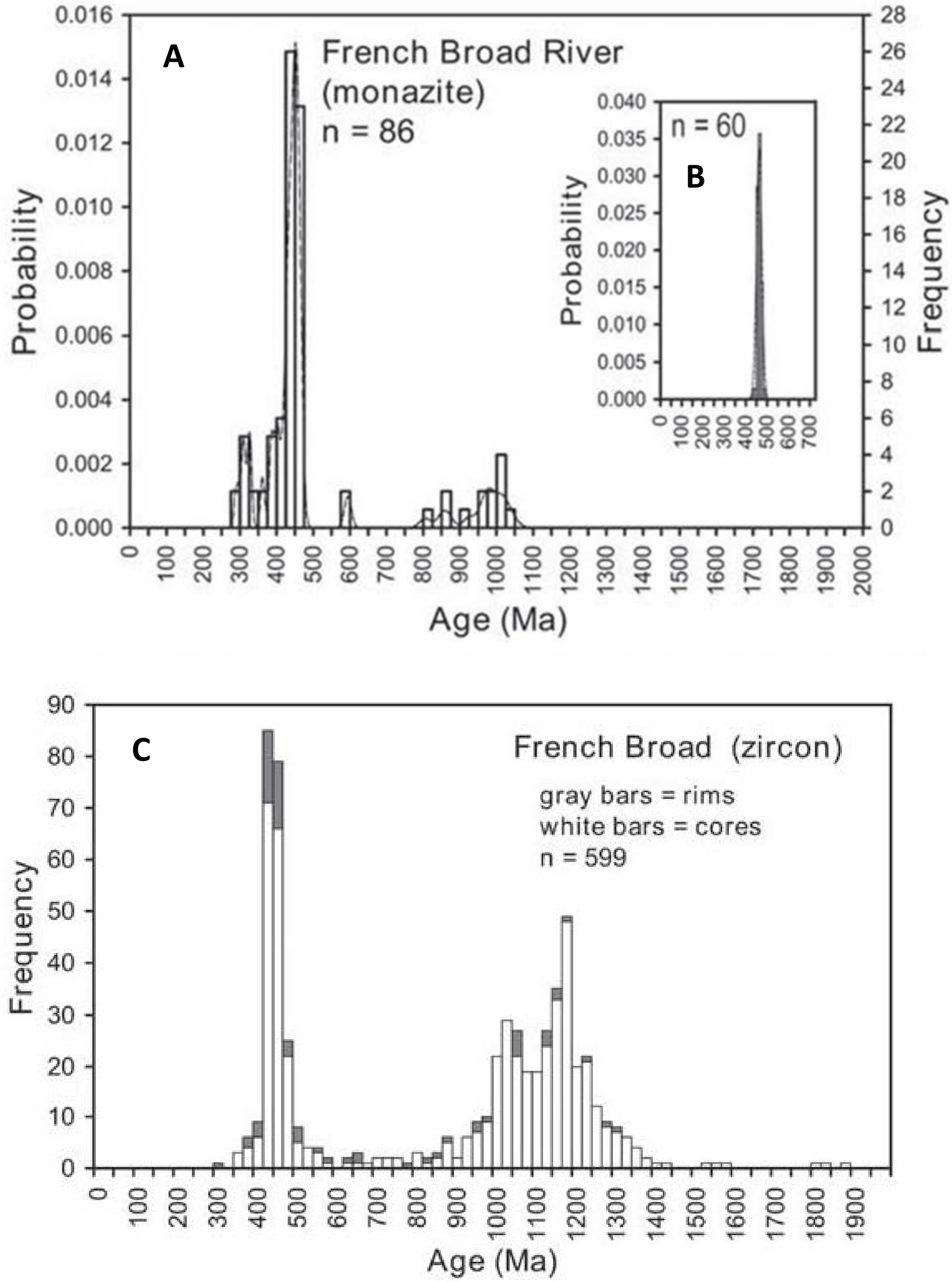

Figure 9. Detrital Th/Pb ages of monazite in the French Broad River(A), and a tributary (B), and U/Pb ages of zircon (C) from Hietpas et al. (2010).

were limited by the requirement of the bulk K/Ar procedure to homogenize K and Ar of a given sample, yielding a single K/Ar age for a population of muscovite crystals. A single sedimentary unit could be expected to contain minerals with a large variety of ages, and individual grains must be dated to discern the distribution of age and infer source region ages. Meyer et al. (2005) analyzed bulk, multigrain samples of muscovite using the K/Ar method from the Pottsville Formation in the northern Appalachian Basin and in the Black Warrior Basin. Uniform ages of ca. 365 Ma were found for samples in the northern Appalachian Basin. However, they reported ages ranging from 297-497 Ma for their samples from the Black Warrior Basin. These ages were interpreted to represent Pre-Acadian to Alleghanian input from the Appalachians and Ouachita Mountains (Meyer et al., 2005).

Laser-extraction single crystal $^{40}Ar/^{39}Ar$ ages were recently determined for muscovite grains from the lower Pottsville Formation in the Cahaba synclinorium (Peavy, 2008; Uddin et al., 2010; Uddin et al., in prep.). These samples came from three outcrops of the lower part of the Pottsville Formation (Figure 10). The stratigraphically highest sample, CHB-5, is ca. 1150 meters above the base of the Pottsville Formation. $^{40}Ar/^{39}Ar$ analysis of muscovite from this sample reveals a dominant age mode of ca. 375 Ma. Sample D2S2 was collected ca. 500 meters from the base of the Pottsville (here and elsewhere, samples D2S1, D2S2, D2S3, and D2S4 are samples from day 2, stops 1, 2, 3, and 4, respectively, in Pashin and Carroll, 1999). Analyses of this sample revealed two prominent age modes of ca. 330 and 375 Ma. The lowermost sample, D2S1, from ca. 400 meters from the base of the Pottsville, has a single age mode of ca. 455 Ma. Peavy (2008) interpreted the three prominent age modes among these samples to be compatible

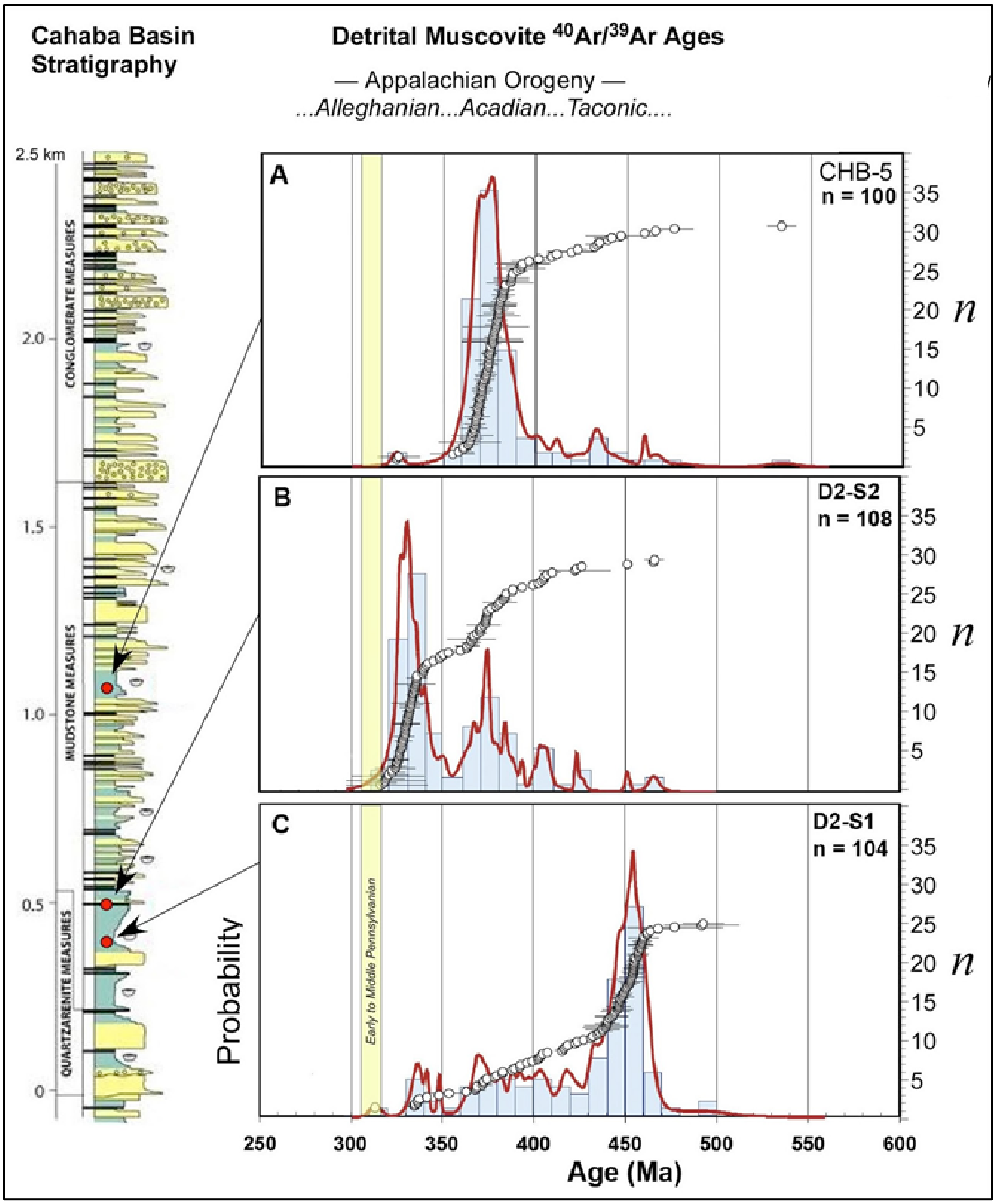

Figure 10. Detrital muscovite $^{40}Ar/^{39}Ar$ age distributions for three samples from the Cahaba synclinorium (adapted from Peavy, 2008; Uddin et al., 2010; in prep.). Stratigraphic column symbols are explained in Figure 5 (from Pashin, 2005).

with derivation of the sediments from the Taconian, Acadian, and Alleghanian metamorphic and igneous rocks of the Appalachians. The fact that the detrital muscovite age distributions are dramatically different among these three samples indicates dramatic changes in the source of sediment supplied to the greater Black Warrior Basin during deposition of the Pottsville Formation, presumably due to some combination of sedimentological and tectonic factors. The 375 Ma muscovite grains present in the higher two samples may have been derived from the same Acadian source terrane. Peavy (2008) suggested that the limited Taconian signal up section may reflect either tectonic or erosional cutoff of drainage from Taconic source rocks.

Chapter 4 – Methods

4.1 Sandstone Composition

Sandstones were subjected to petrographic study. Samples for analysis were collected at the Alabama Geological Survey from the Hendrix and Brooks Cores (Figure 1 for location). Thick, fine- to coarse-grained sandstone sequences were chosen for internal consistency in both sandstone compositional analysis and detrital muscovite geochronology. Thin sections of 28 sandstones (15 from the Hendrix core and 13 from the Brooks core) were made at Spectrum Petrographic, following standard protocol. Half of each thin section was stained with potassium rhodizonate to discern plagioclase and sodium cobaltinitrite to discern potassium feldspar. Point counting of minerals followed the procedure prescribed by the Gazzi-Dickinson method (Ingersoll et al., 1984), where at least 300 grains were identified per sample. The samples were analyzed using a stage movement device and counter. The following grains were identified, and grouped later according to the analysis performed: Monocrystalline quartz (Qm), polycrystalline quartz (Qp), plagioclase feldspar, potassium feldspar, carbonate, muscovite, igneous lithic, metamorphic lithic, sedimentary lithic, microcrystalline quartz, and chert. In the analysis shown later, Qt equals all quartz grains including chert, and Lt equals all lithic grains including chert and polycrystalline quartz. Only sand size grains were counted, and grains within lithic fragments were counted as lithic fragments because they were finer than sand. Following data collection, the data were plotted on ternary diagrams of Dickinson et al. (1985) using the spreadsheet constructed by Zahid and Barbeau (2011).

In addition to modal mineralogy, petrographic study of the sandstones included textural observations. Such observations include clay content, sorting, rounding, cement type, and average grain size. These observations were made qualitatively, using various estimation charts.

4.2 Conglomerate Characterization

Three conglomerate samples were collected at depths of 1104, 1112, and 1174 feet from the Hendrix core and used to prepare large (2x4 inch) thin sections. Additionally, conglomeratic sandstones were collected from outcrop locations in northeast Alabama from the base of the Pottsville Formation. The locations of these samples are marked on Figure 2 by green triangles. Petrographic analysis focused on identification of major clast types, which provide direct evidence of rock types in the source area. No effort was made in this study to quantify the abundance of clast types in these conglomerates.

4.3 Detrital Muscovite Preparation for $^{40}Ar/^{39}Ar$ Dating

Twenty-three samples from the Hendrix core and thirteen samples from the Brooks core were selected for mineral separation (Figure 2 and Appendix 2). Samples were chosen from thick (> 1 ft), medium- to coarse-grained sandstone units for internal consistency and abundance of coarse muscovite grains. Additional data reported herein are derived from samples collected by previous workers from the Cahaba synclinorium (Peavy 2008; Uddin et al., in prep.).

Samples were crushed and sieved to separate muscovite grains. Separates from the 40-60 standard sieve size (250-425 micron) were preferred, although grains from the

60-80 standard sieve size (177-250 micron) were also used if needed. Muscovite grains were separated from other minerals in selected fractions first by paper shaking to remove equant grains such as quartz and feldspar. Then, some thick equant muscovites were picked by hand to remove the bias of picking only very flat and thin muscovite. Once the steps described above were completed (which simply increased the ratio of muscovite to other grains), approximately 300 muscovite grains were handpicked for each sample. Vermeesch (2004) suggested a range of ca. 95-120 detrital grains will permit a 95% certainty for detection of any age component composing 5% or more of a population in detrital geochronology studies. Preference in grain selection was given to grains that looked unaltered (to prevent sampling grains with excess argon loss). Grains with a variety of textures (such as presence and absence of inclusions and variations in grain clarity) were sampled so as to include all possible sources of a given sample.

The $^{40}Ar/^{39}Ar$ dating method was used in this study to determine the age of detrital muscovite. Potassium has three naturally occurring isotopes (^{39}K, ^{40}K, and ^{41}K), and the proportion of these in all geologic materials is 7775 : 1 : 558.3 (respectively). ^{40}Ar is a stable isotope converted from ^{40}K as a product of electron capture with a half-life of 1.25 billion years. In the $^{40}Ar/^{39}Ar$ dating technique, existing ^{39}K is converted into ^{39}Ar in a nuclear reactor, and then the amount of ^{40}Ar relative to ^{39}Ar is measured in a mass spectrometer. The measured age is determined with the following equation (Merrihue and Turner, 1966):

$$t = \frac{1}{\lambda}\ln\left(\frac{40\mathrm{Ar}}{39Ar}J + 1\right)$$

In this equation t is the age of the sample, λ is a decay constant, and J is a variable determined to account for ^{39}Ar production and its relationship to ^{40}Ar. The details of the $^{40}Ar/^{39}Ar$ method and current practices are provided in McDougal & Harrison (1999).

After mineral separation, muscovite grains were encapsulated within an aluminum package, then vacuum sealed in glass for irradiation with fast neutrons. Two reactors were used in this study: (1) The McMaster Nuclear Reactor at Hamilton University in Ontario, Canada for the Hendrix core, Carbon hill, and Cahaba samples (samples with the prefix ‘au18’ and ‘au16’ in Appendix 2); and (2) The US Geologic Survey TRIGA reactor in Denver, Colorado for the Brooks core samples (samples with the prefix ‘au21’ in Appendix 2). Each package contained the monitor mineral Fish Canyon Sanidine (with an assigned age of 28.02 Ma; Renne et al., 1998) to evaluate the J value used for each layer of the irradiation package. Following irradiation, muscovite grains were analyzed by single-crystal laser ablation in the ANIMAL (Auburn Noble Isotope Mass Analysis Laboratory) facility. The laser sampling system in ANIMAL can conveniently accommodate 112 individual mineral grains from a given sample per loading cycle in the configuration used for this study, and that is the number of grains loaded for each sample for analysis.

Chapter 5 – Data and Results

5.1 Sandstone Composition

Tables 1 and 2 show the modal mineralogy and textures of all the sandstones analyzed in this study. The sample names indicate the core they were taken from, and the sample number indicates the depth of the sample (in feet from mean sea level; Figure 11). Note that the two samples from the bottom of the Brooks core (BRK 1957 and 1971) are from the Parkwood Formation, not the Pottsville. Figures 12 and 13 show data for the samples from the Brooks and Hendrix cores, plotted on the ternary diagrams of Dickinson et al. (1985).

Compositional and textural differences are clear between the two cores: Samples from the Hendrix core are less mature and contain more labile grains than samples from the Brooks core. The average composition for the Hendrix core is $Qt_{59}F_{13}L_{28}$ and $Qm_{32}F_{13}Lt_{55}$, while the average composition for the Brooks core is $Qt_{79}F_{12}L_{10}$ and $Qm_{59}F_{12}Lt_{30}$. In particular, lithic fragments are more abundant and grain sorting and rounding are lower in the Hendrix core.

While the typical Hendrix core sandstones contain more immature grains than the Brooks core samples, a few samples from the Brooks core have nearly identical compositions as some from the Hendrix core. However, samples with similar compositions between these two cores are on opposite end-members of the compositional distribution; i.e., the most mature sediments from the Hendrix core and the least mature sediments from the Brooks core have similar compositions. For example, sample BRK 354 has a composition of $Qm_{36}F_{28}L_{36}$ and sample HDX 4271 has a composition of

Table 1. Modal mineralogy of the Hendrix and Brooks cores. Abbreviations are as follows: Mono, Monocrystalline; Poly, Polycrystalline; Plag, Plagioclase; Feld, Feldspar; LF, Lithic Fragment; Unkn, Unknown; Musc, Muscovite; Carb, Carbonate; K, Potassium; Qtz, Quartz; Ign, Igneous; Meta, Metamorphic, Sed, Sedimentary; Mx, Microcrystalline; Qt, Total Quartz; Qm, Monocrystalline Quartz; Lt, Total Lithics; Ave, Average; StDev, Standard Deviation.

Hendrix Core

Sample #	566	622	1094	1176	1579	1791	1919	1978	2012	2650	3527	3875	3955	4216	4271
Mono Qtz	87	74	84	75	140	97	110	62	84	107	68	82	118	94	111
Poly Qtz	81	104	90	93	88	91	67	55	47	69	89	72	47	81	60
Plag. Feld	17	20	14	18	16	28	15	17	27	39	32	47	22	45	48
K Feld	17	11	8	9	0	8	4	3	11	0	0	1	0	0	0
Musc	0	3	2	4	2	0	2	5	13	2	6	2	0	2	5
Carb	0	0	0	1	0	1	12	0	0	13	1	6	57	4	12
Chert	20	9	16	13	8	5	4	35	4	6	2	3	10	4	1
Ign LF	0	5	8	10	3	1	2	4	0	0	0	1	0	2	0
Meta LF	35	54	62	68	41	62	60	72	34	46	55	49	8	40	35
Sed LF	25	12	7	6	1	5	3	18	78	13	39	30	21	12	21
Mx Qtz	5	3	5	3	1	1	9	8	1	5	8	7	5	16	1
Unkn	13	5	4	0	0	1	12	21	1	0	0	0	12	0	6

QFL																Ave.	StDev
Qt %	60	62	61	58	77	63	65	46	46	61	56	54	59	64	60	59	8
F %	12	11	7	9	5	12	11	7	13	17	11	18	27	16	21	13	6
L %	28	27	32	33	18	24	24	47	41	22	33	28	14	19	20	27	9
Qm %	30	25	29	25	47	32	38	23	29	36	23	28	41	32	38	32	7
F %	12	11	7	9	5	12	11	7	13	17	11	18	27	16	21	13	6
Lt %	58	64	64	65	48	55	51	70	57	47	66	54	32	52	41	55	10

Brooks Core

Sample #	100	354	451	486	698	1004	1056	1375	1708	1852	1914	1957	1971
Mono Qtz	126	102	229	195	175	207	130	225	217	178	217	132	110
Poly Qtz	66	62	34	43	55	55	54	49	41	72	38	72	69
Plag. Feld	45	53	3	19	28	4	50	7	7	15	4	10	48
K Feld	8	13	0	0	3	0	3	0	2	1	0	2	25
Musc	7	16	1	1	6	3	13	1	0	2	1	0	8
Carb	16	14	16	7	1	1	3	0	2	0	11	12	2
Chert	6	5	5	2	2	0	4	0	2	0	2	2	16
Biotite	0	0	0	0	0	0	3	0	0	0	0	0	2
Ign LF	0	0	0	0	0	0	0	0	1	0	1	3	0
Meta LF	19	24	10	24	18	16	30	16	22	18	12	57	15
Sed LF	5	8	0	1	8	2	13	0	0	0	1	0	0
Mx Qtz	2	3	0	2	4	4	0	2	5	6	4	10	0
Unkn	0	0	2	6	0	8	0	0	1	8	9	0	7

QFL														Ave.	StDev
Qt %	66	59	89	82	80	92	64	92	88	88	89	71	63	79	12
F %	24	28	6	9	11	2	20	2	4	6	5	8	26	12	9
L %	10	13	5	9	10	6	16	5	8	6	6	21	11	10	5
Qm %	43	36	77	67	60	72	45	75	73	61	75	44	39	59	15
F %	24	28	6	9	11	2	20	2	4	6	5	8	26	12	9
Lt %	33	36	16	25	30	27	35	22	24	33	20	48	35	30	8

Table 2. Textural observations of the Hendrix (HDX) and Brooks (BRK) core sandstones. High clay contents, poor sorting, and relatively angular grains are associated with immature sediment, whereas better sorted sediments containing relatively little clay are associated with mature sediment.

Samples	Clay %	Sorting	Rounding	Cement	Grain size (mm)
HDX 566	5-10	Mod. Well	Sub-rounded	Silica	0.1-0.3
HDX 622	10	Poorly	Sub-rounded to sub-angular	Silica	0.2-0.5 --> 2
HDX 1094	< 5	Poorly	Sub-rounded	Silica	0.1-0.25 --> 2
HDX 1176	< 5	Mod. Well	Sub-rounded	Silica	0.1-0.7
HDX 1579	< 5	Well	Sub-rounded	Silica	0.05-0.25
HDX 1791	20	Poorly	Sub-angular	Silica	0.05-0.25
HDX 1919	10	Mod. Well	Sub-rounded	Silica & Calcite	0.1-0.3
HDX 1978	10	Very Poorly	Sub-rounded to angular	Silica	0.5-1
HDX 2012	15	Poorly	Angular	None?	0.05-0.2
HDX 2650	< 5	Mod. Well	Sub-rounded to sub-angular	Calcite	0.2-0.4
HDX 3527	5-10	Mod. Well	Sub-angular	Indist.	0.1-0.2
HDX 3875	10	Well	Sub-rounded	Calcite	0.1-0.3
HDX 3955	10	Poorly	Angular to rounded	Calcite	0.1-0.6
HDX 4216	< 5	Well	Sub-angular to rounded	Iron-Oxide	0.25-0.4
HDX 4271	10	Mod. Well	Sub-rounded	Calcite	0.1-0.3
BRK 100	< 5	Poorly	Angular	Calcite	
BRK 354	20-30	Poorly	Angular	Silica	0.05-0.2
BRK 451	< 5	Mod. Well	Sub-rounded	Silica & Calcite	< 0.2
BRK 486	7	Mod. Well	Sub-rounded	Silica & Calcite	0.1-0.4
BRK 698	< 5	Mod. Well	Sub-rounded	Silica	0.05-0.25
BRK 1004	< 5	Poorly	Sub-rounded	Calcite	0.1-0.7
BRK 1056	20	Very Poorly	Sub-angular	Silica	0.05-0.2
BRK 1375	< 5	Well	Rounded	Silica	0.1-0.4
BRK 1708	< 5	Mod. Well	Sub-rounded	Silica & Calcite	0.2-0.5
BRK 1852	10-80	Poorly	Sub-rounded	Silica	0.1-0.25
BRK 1914	< 5	Well	Well-rounded	Calcite	0.15-0.5
BRK 1957	< 5	Well	Sub-rounded to sub-angular	Calcite	0.2-0.5
BRK 1971	20	Mod. Well	Sub-angular	Calcite	0.2-0.125

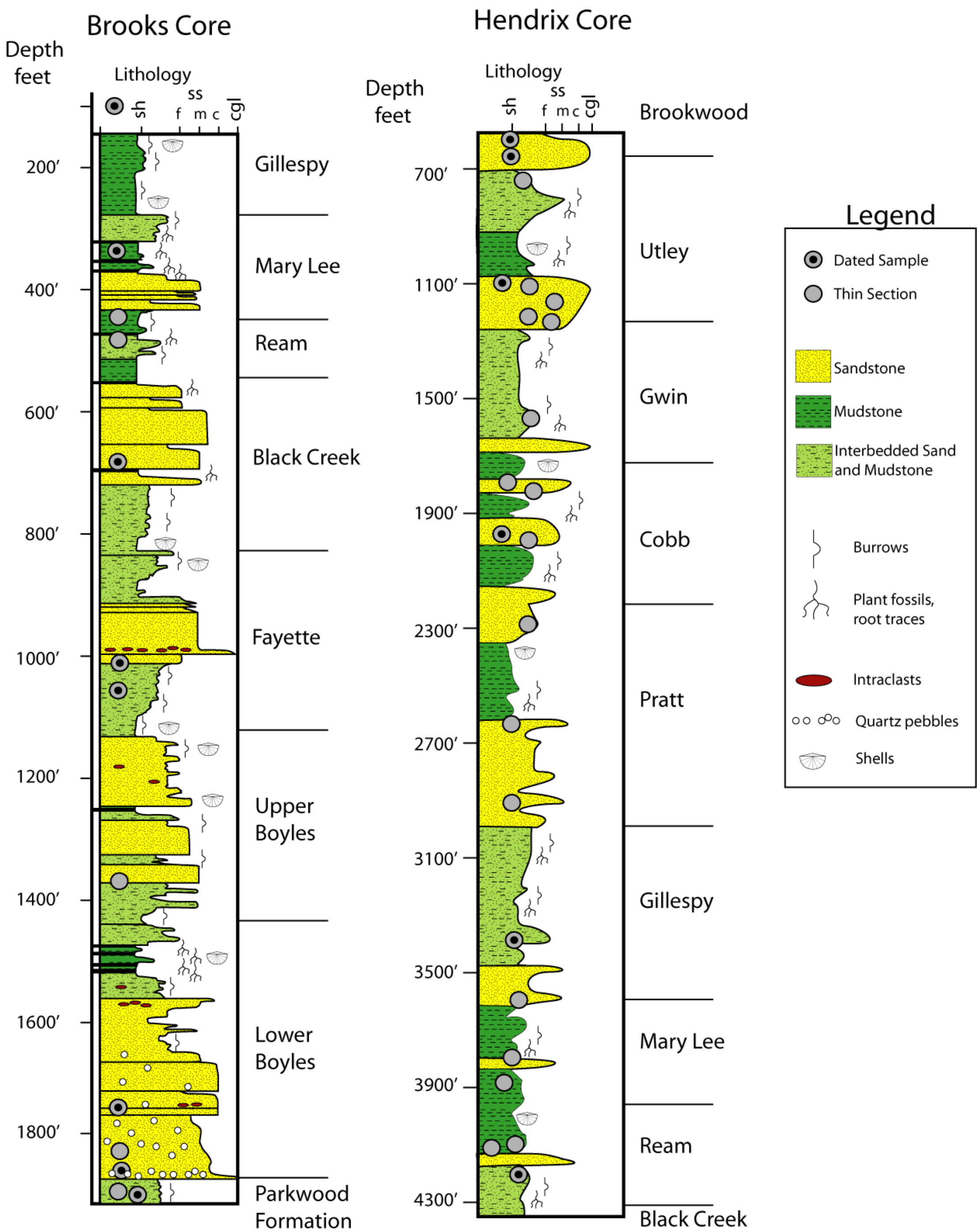

Figure 11. Simplified stratigraphic columns of the Pottsville Formation in the Hendrix and Brooks cores. Note that the scales for the two cores are different. Major coal zones are labeled to the right of each column. Samples used for detrital muscovite geochronology, which were also analyzed petrographically, are indicated by a bulleted circle, while samples analyzed only petrographically are indicated by a grey circle (Brooks core column modified from Pashin, 2004).

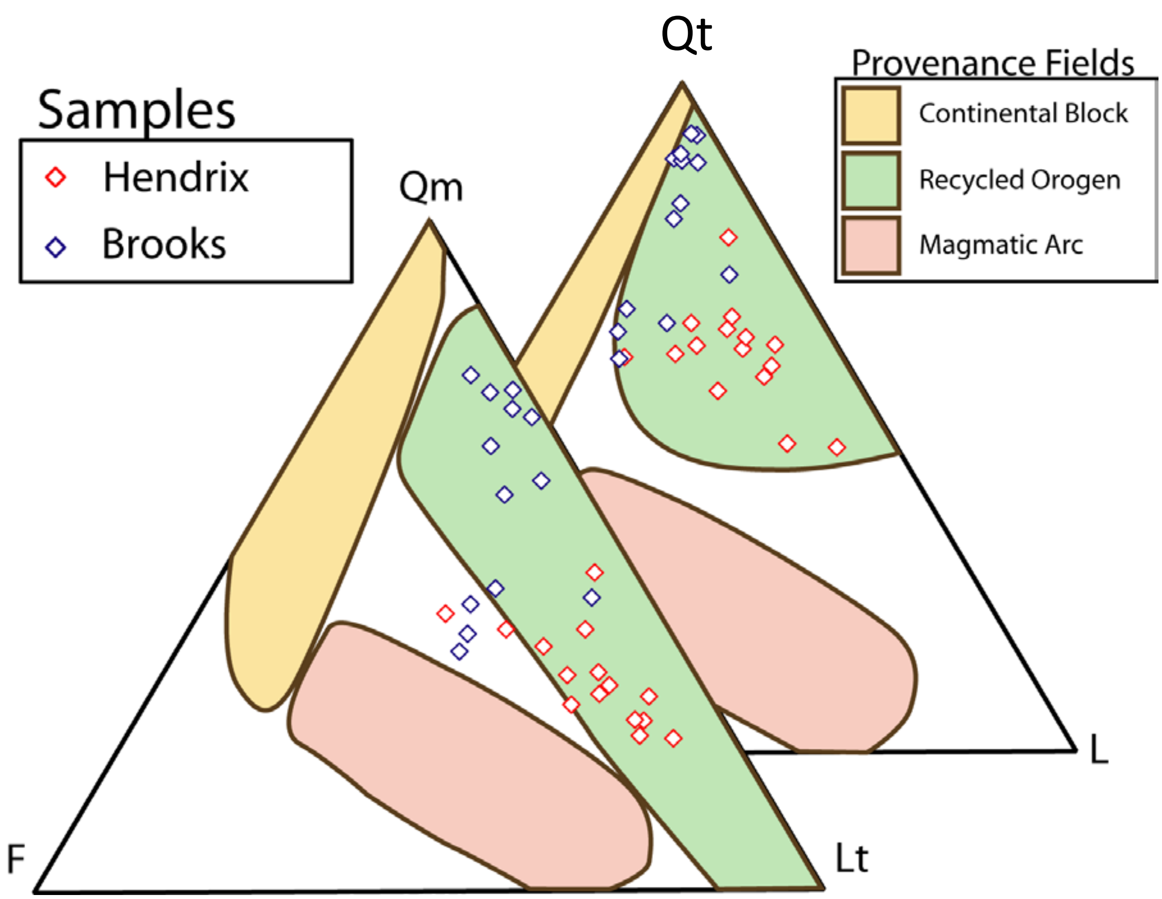

Figure 12. QtFL and QmFLt plots of individual sample data from the Hendrix and Brooks cores showing two clusters of data from the Brooks, one group more quartzose than the other. The less quartzose compositions from the Brooks core plot near the Hendrix samples, and away from the other Brooks samples.

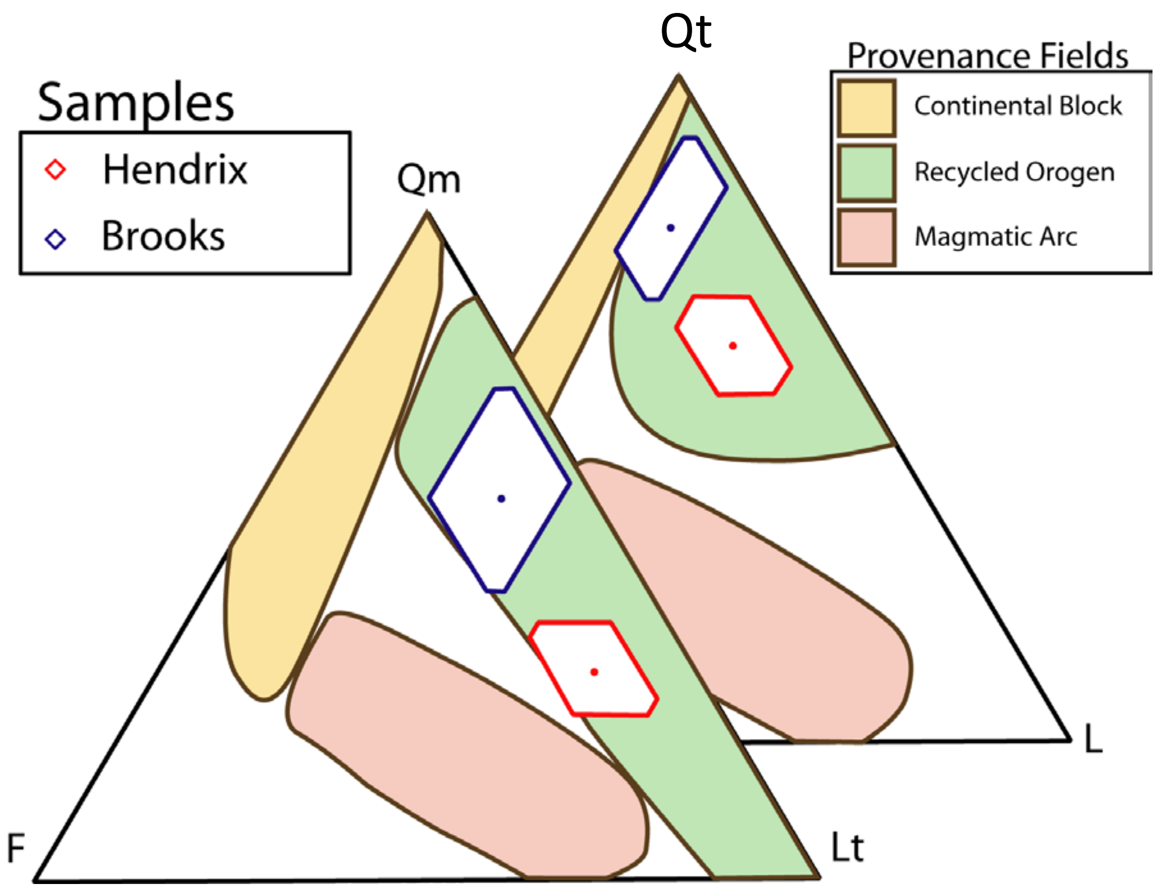

Figure 13. QtFL and QmFLt diagrams showing the composition of the Pottsville Formation within the context of the provenance fields of Dickinson (1985). Standard deviation polygons and mean compositions are indicated by the polygons and dots, respectively.

$Qm_{38}F_{21}L_{41}$. These compositions are very similar, but BRK 354 is one of the least mature sediments from the Brooks core, and HDX 4271 is one of the most mature sediments from the Hendrix core. Thus, although some samples from each core have similar compositions and textural maturity, the overall distribution of sediment composition and texture is very different. This is best shown in Figure 13, wherein the standard deviation polygons for the two cores do not overlap.

5.2 Conglomerate Characterization

Conglomerates at the base of the Pottsville Formation are overwhelmingly quartzose, with few metamorphic or igneous clasts (Figure 14A, B). These quartzose grains are mostly chert, polycrystalline quartz, or vein quartz. In contrast, conglomerate clasts in the upper Pottsville include a variety of metamorphic, igneous, and sedimentary rocks. Conglomerates from the upper Pottsville also contain common quartzose rocks such as chert, quartzite, and vein quartz. However, they also contain a variety of metamorphic, sedimentary and igneous clasts. Metamorphic clasts compose the majority of granules present in these conglomerates. These are dominantly low-grade metasedimentary rocks, such as low-grade schist, phyllite and slate (Figure 15A, D). Sedimentary clasts include chert, sandstone, and reworked mud chips. Many chert pebbles contain fossils (Figure 15B) that are similar to fossils described by Tobin (2004) as “Paleolyngbya” in chert from the Knox Group. Volcanic clasts are a minor, but important, component of the conglomerates. Two types of volcanic clasts occur in approximately equal amounts: basalt granules comprising a fine matrix of plagioclase microlites and larger plagioclase phenocrysts with skeletal and hopper texture (Figure 15F); and porphyritic rhyolite containing feldspar phenocrysts suspended in a

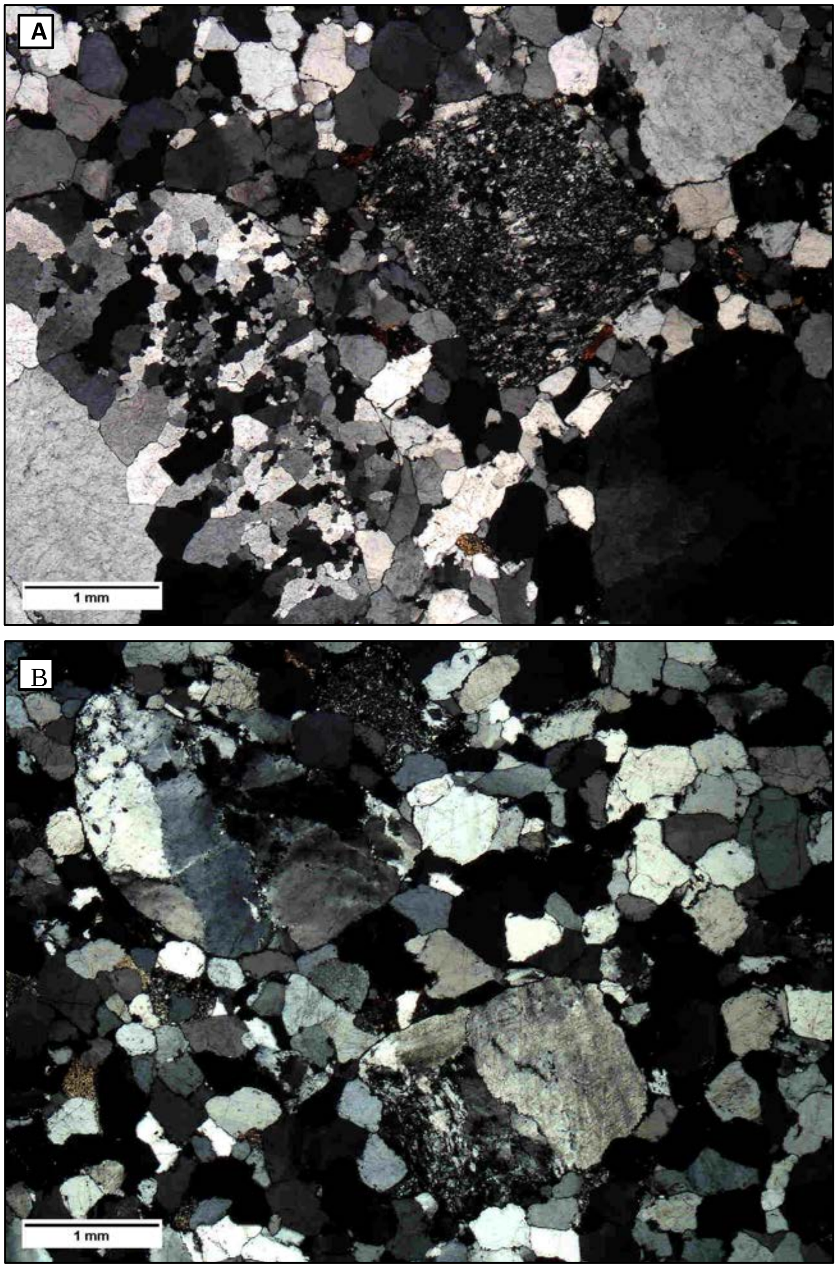

Figure 14. Granules in sandstones from near the base of the Pottsville Formation are entirely quartzose. Photomicrograph A shows 2 granules in a sandstone collected from outcrop in Gadston, AL (Sample GDN-2; coordinates for location are in Appendix 1), one an elongate polycrystalline quartz clast (bottom left) and the other an ovate vein quartz clast (upper right). Photomicrograph B shows a deformed quartz granule (the upper left corner) from a sandstone collected from outcrop in Desoto, AL (Sample DS-3; coordinates for location are in Appendix 1), approximately 2 mm in diameter.

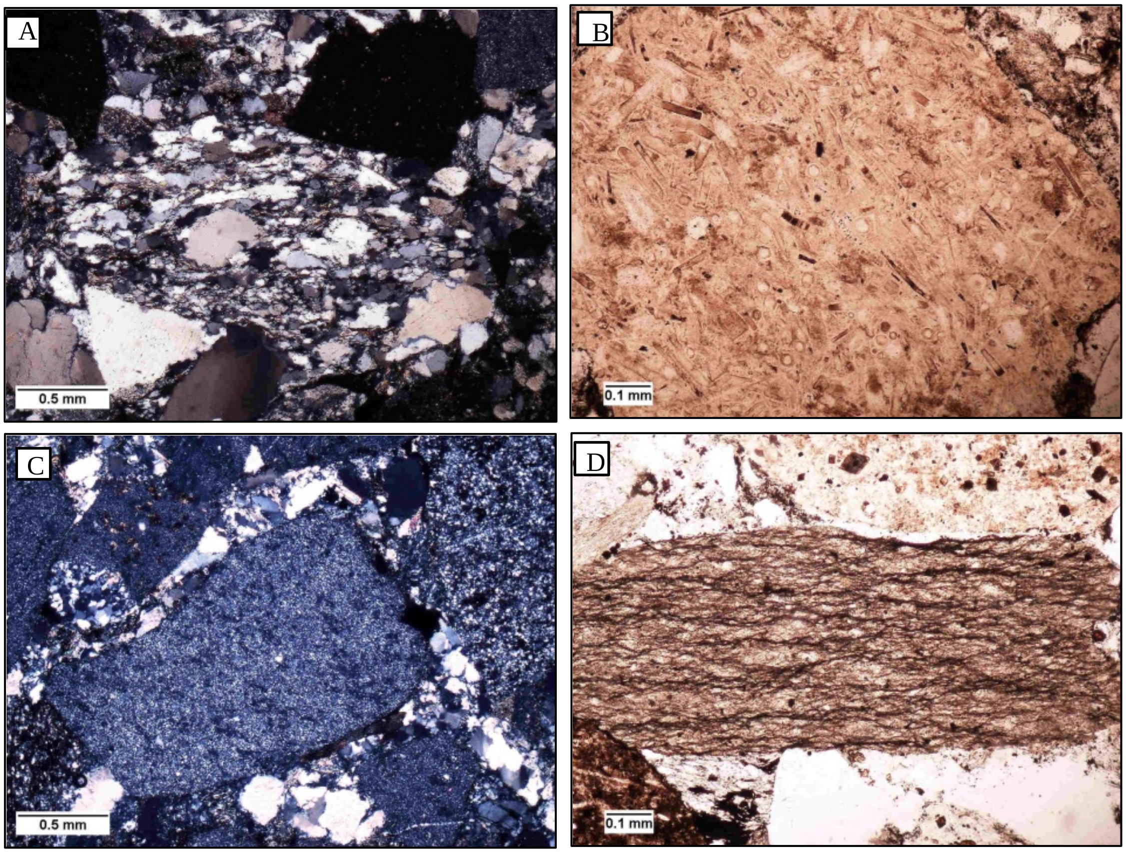

Figure 15. Photomicrographs of representative conglomerate clasts in the Pottsville Formation from sample HDX 1174. (A) Typical 2-mm-long metamorphic clast with a foliation defined by micas and elongate quartz. (B) Chert clasts viewed in plane-polarized light with ghosts of fossils similar to fossils in chert from the Knox Group. Note the cylindrical shape, dark internal chambers, and various orientations of the fossils. (C) Chert clasts. (D) Low-grade metamorphic clast (phyllite) viewed in plane-polarized light. Note the planar fabric.

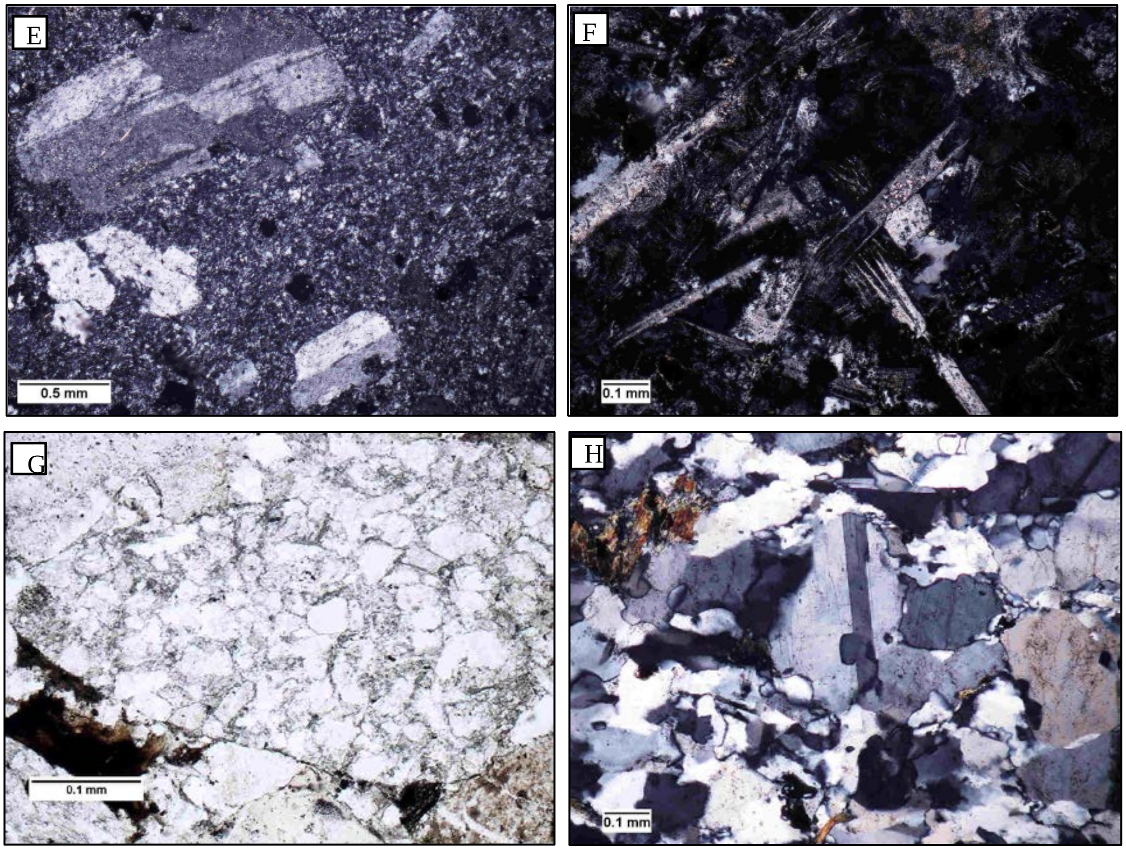

Figure 15 continued. (E) Rhyolite clasts in conglomerate from sample HDX 1104. Note the bimodal crystallinity within the grain. (F) "Hopper" texture of plagioclase laths in a basalt pebble from sample HDX 1104. (G) Recycled sedimentary clasts (sandstone grain) from HDX 1112 viewed in plane-polarized light. (H) Gabbroic clast from sample HDX 1112 that includes feldspars (twinning, center) and amphiboles (not readily evident).

fine-grained matrix (Figure 15E).

5.3 Detrital Muscovite Geochronology

Detrital muscovite geochronology was applied to samples from both surface exposures and the Hendrix and Brooks cores. These ages are shown in Figures 16-19. Samples from surface exposures of the Pottsville Formation in the Cahaba synclinorium were originally collected by Peavy (2008) and her earlier results are presented along with new data from the current study (See Figure 2 and Appendix 1 for sample locations). Each sample plot in Figures 16-19 shows a yellow vertical bar, which represents the age of 308.58 ± 1.22 Ma determined for an ash layer in an upper stratigraphic section of the Pottsville Formation of Mississippi (Uddin et al., 2010; Uddin et al., in prep.). Sample D2-S3 (Figure 16F) has an age distribution similar to sample D2-S1 of Peavy (2008; Figure 16E), with a dominant 450 Ma mode, as well as minor 375 and 330 Ma modes. Sample D2-S4 (Figure 16C) contains a wide spectrum of ages, contrasting with the other Cahaba samples, which have single dominant modes. This sample has a broad 360 – 390 Ma age mode, with ages sampling the entire 320 – 450 Ma range.

One sample from a surface exposure from the Black Warrior basin was collected from an outcrop in Carbon Hill, AL (Sample CHN, Figure 2 and Appendix 1 for location). This sample is from the Mary Lee coal zone, which occurs in both of the cores used in this study. Thus, this sample can be compared with data from the Hendrix and Brooks cores. This sample contained well-defined 440, 355, and 320 Ma age modes (Figure 17).

Detrital geochronology focused largely on samples from the Hendrix and Brooks

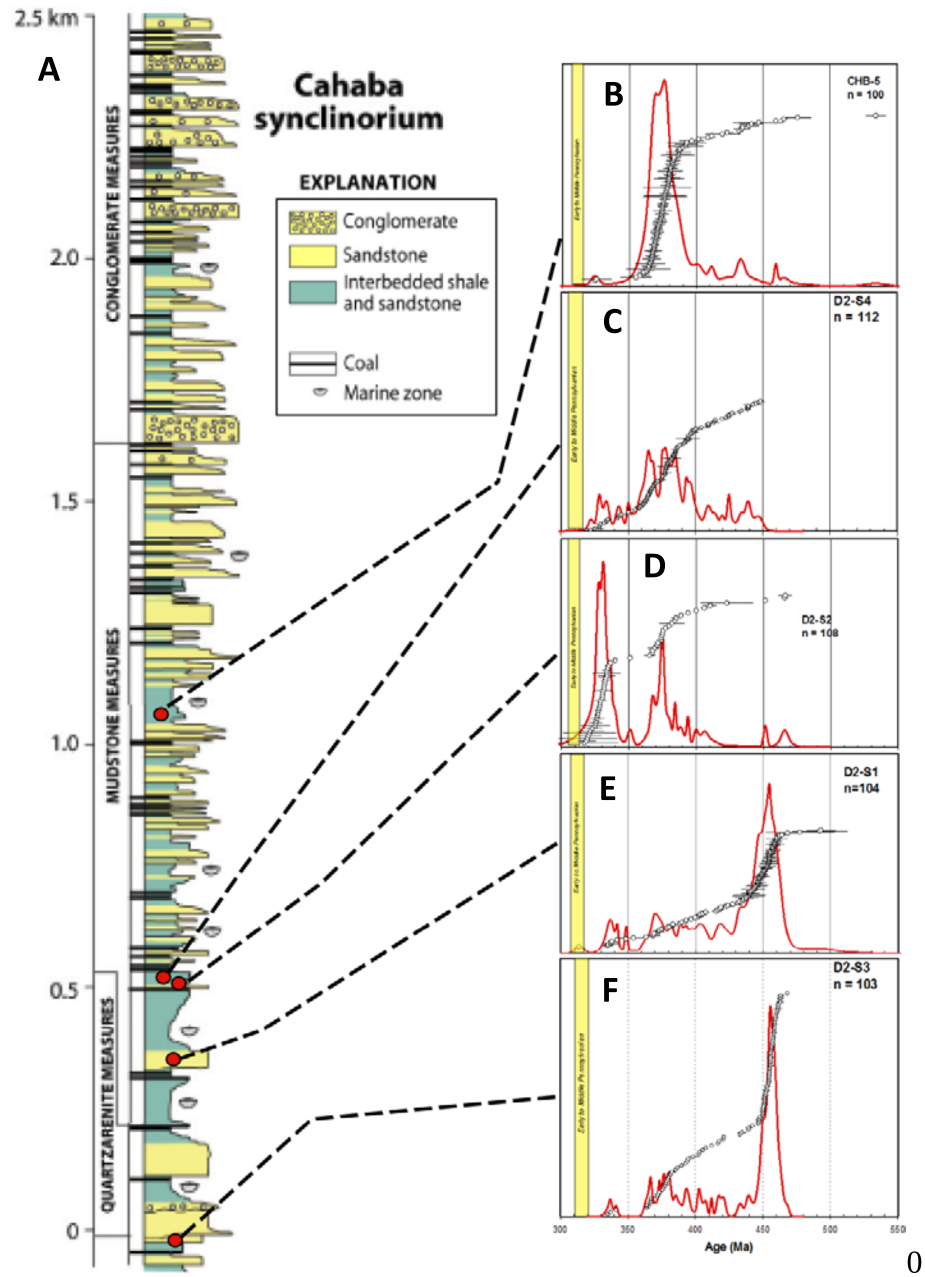

Figure 16. Stratigraphic column for the Cahaba synclinorium (from Pashin, 2005) showing the location of samples used in detrital geochronology. The yellow bar at the left of each age plot indicates the maximum inferred age of deposition for the Pottsville Formation of the GBWB as discussed in the previous text (from Uddin et al., 2010; Uddin et al., in prep.). Plots from previous work are included in B, D, and E(from Peavy, 2008; see Figure 10) and plots of new data are provided in C and F. Note that coarse-grained sandstone samples from the lower Pottsville are dominated by a Taconic signal, and samples from fine-grained sandstones at higher stratigraphic levels are dominated by Alleghanian or Acadian signals.

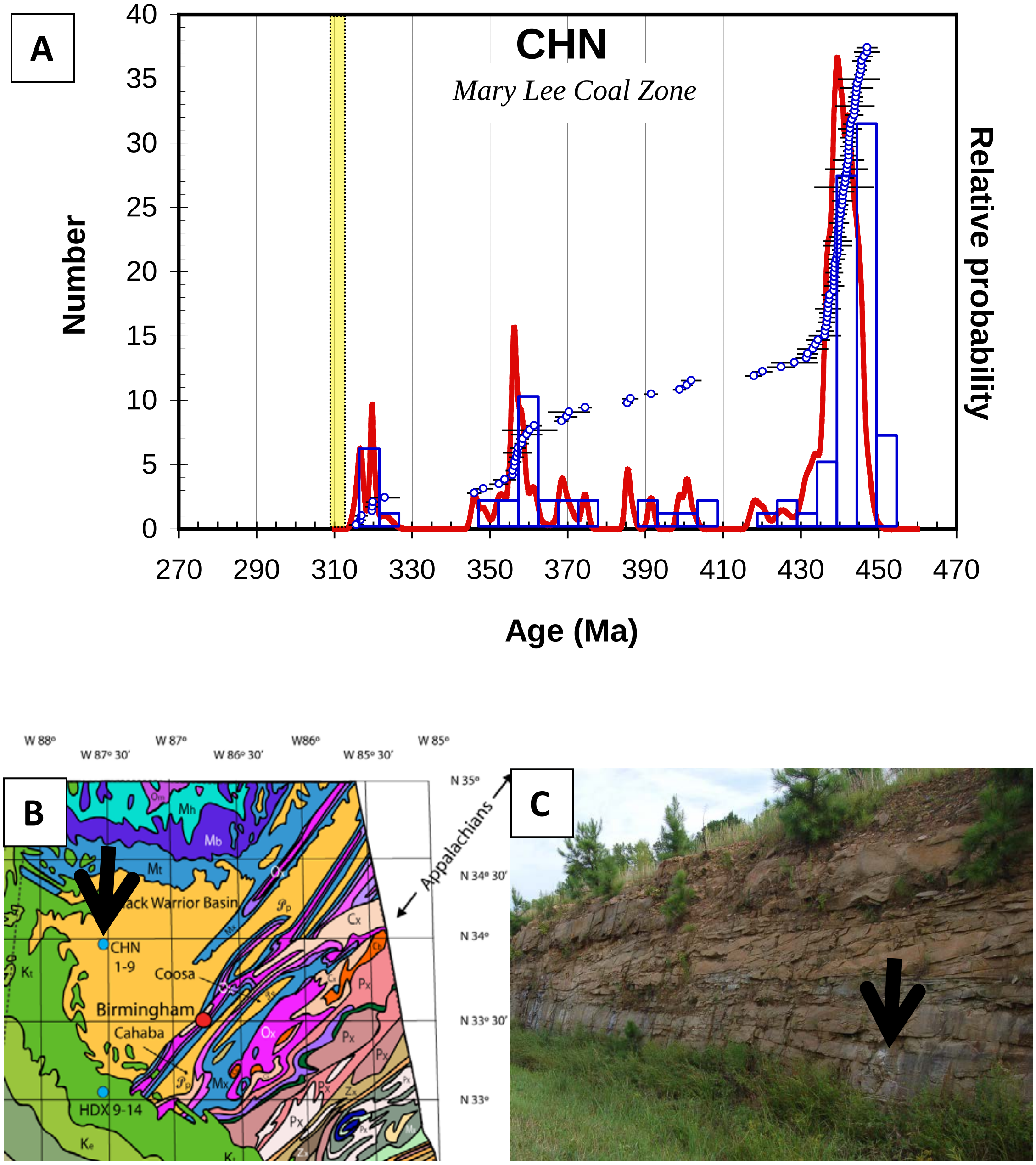

Figure 17. (A) Detrital muscovite ages for sample CHN from a surface exposure of the BWB in the Mary Lee coal zone. Yellow bar indicates maximum inferred age of deposition as discussed in the text. This sample is located in the center of the BWB (B), and was collected from a thick sandstone about 1.5 m above the base of an exposure (at the point indicated in C; Latitude 33° 55.387', Longitude W 87° 31.362') on the west side of Highway 78, 75 meters north of a sign for exit #46 (County road 11; Carbon Hill, Nauvoo).

cores. Six samples from the Hendrix core (Figure 18) were analyzed to determine age distributions (for stratigraphic locations, see Figure 11 and Appendix 1). Samples were collected from prominent sandstones in the bottom, middle, and top intervals of the core. All samples from the Hendrix core contain a very strong 320 Ma mode, with least 75% of the ages ranging from ca. 310-330 Ma. Another prominent age mode for the Hendrix core samples occurs at ca. 370 Ma with many ages between 350-390 Ma. The ca. 370 Ma age is most dominant in the highest stratigraphic sample, HDX 566, which was collected from the Brookwood coal zone. All samples include some grains with ages between ca. 400-450 Ma, but these Silurian to Ordovician age micas constitute less than 5% of any of the Hendrix core samples. Most samples contain muscovite grains that are consistently older than or within the error range of the stratigraphic age of the Pottsville. However, some samples (e.g., HDX 1978 and 622) had a few grains that are younger than this depositional age. These abberant ages are probably due to post-depositional argon loss in very small grains; muscovite grains from these samples were collected from smaller grain-size portions due to lack of coarse muscovites. This is supported by the low ^{39}Ar yields and larger age errors for these samples (see Appendix 1).

Seven samples of the Pottsville Formation from the Brooks core were analyzed (Figure 19), along with an additional sample from the underlying Parkwood Formation (for stratigraphic locations, see Figure 11 and Appendix 1). The distribution of ages and modes defined for samples of the Brooks core differ from those of the Hendrix core samples. The lowest sample, from the Parkwood Formation, BRK 1971, has three age modes of ca. 440, 360, and 320 Ma. The results for the Parkwood sample are similar to the age distribution for a stratigraphically higher sample, BRK 698, and also to sample

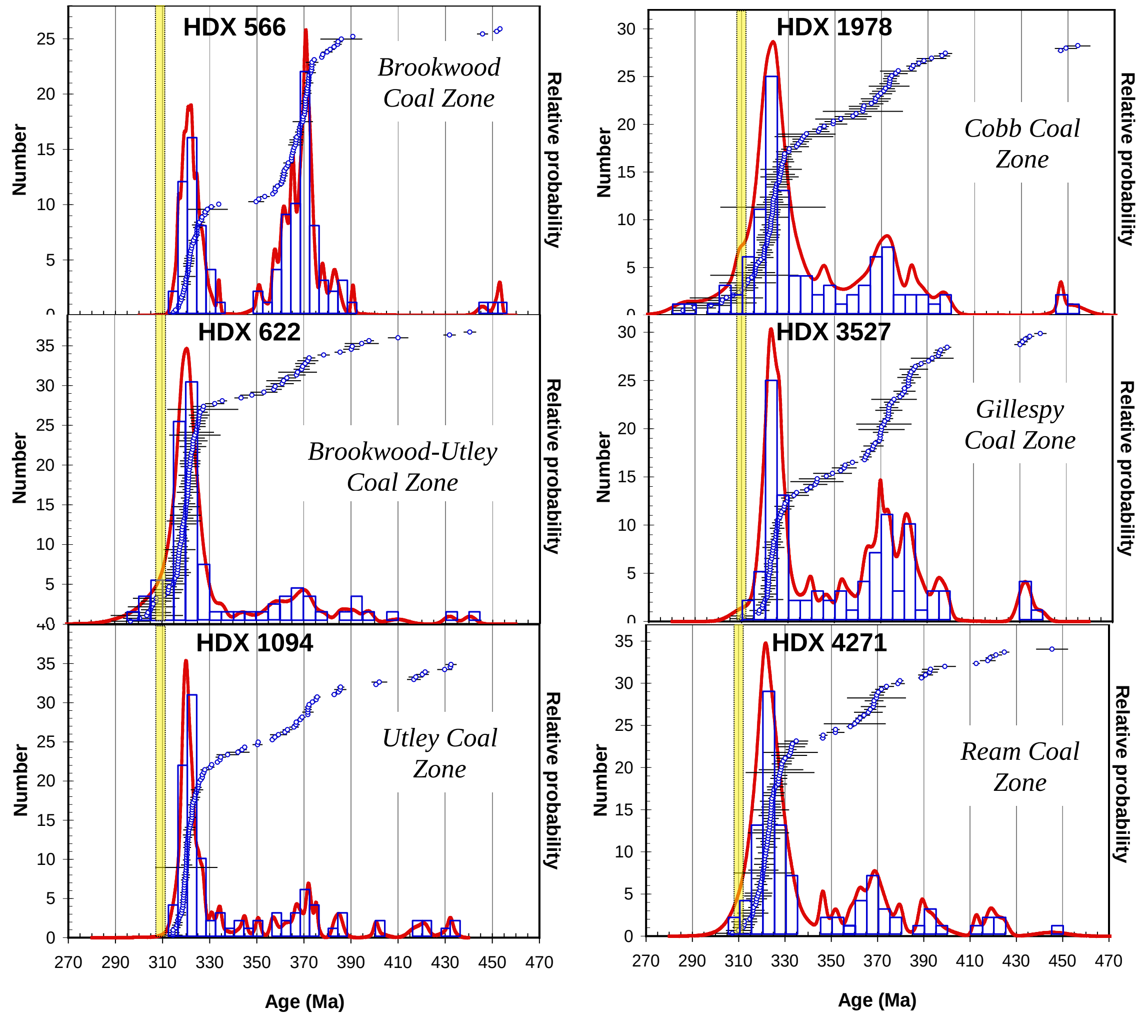

Figure 18. Detrital muscovite age plots for all samples of the upper Pottsville in the Hendrix core. See Figure 11 for stratigraphic locations. Coal zones are indicated on the plots, and sample names indicate the depth in feet (e.g., HDX 566 was collected from a depth of 566 feet). Yellow bar indicates maximum inferred age of deposition as discussed in the text.

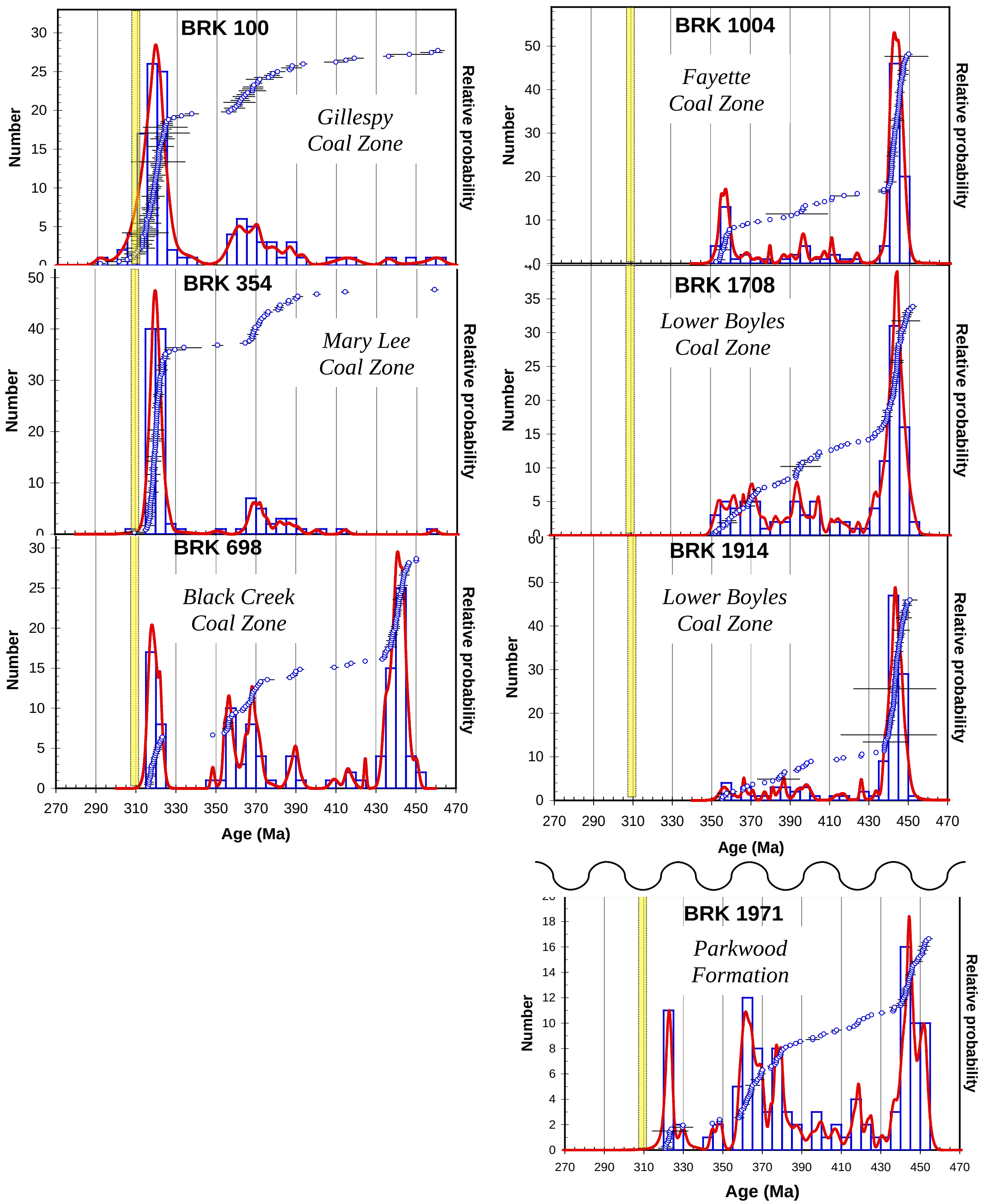

Figure 19. Detrital muscovite age signatures for Brooks core. See Figure 11 for stratigraphic locations. Coal zones are indicated on the plots, and sample names indicate the depth in feet. An unconformity (represented by the wavy line) separates samples from the Pottsville and the Parkwood Formation. Yellow bar indicates maximum inferred age of deposition as discussed in the text.

CHN from the Mary Lee coal zone (Figure 17). The 3 lowermost Pottsville samples (BRK 1914, 1708, and 1004) are dominated by a 450 Ma mode. These three samples have no muscovite with ages less than ca. 350 Ma, and limited amounts of muscovite between ca. 350-430 Ma. These samples stand in stark contrast to the stratigraphically highest samples, BRK 354 and BRK 100, which are dominated by a 320 Ma mode. These two samples have a limited number of ages (less than ca. 20%) between 330-450 Ma, and are similar to the distribution of ages of samples from the Hendrix core (Figure 18).

Only a few samples in the Black Warrior basin reveal prominent age modes characteristic of all three Appalachian orogenic events. Samples BRK 698, BRK 1971, and CHN contain all three modes of ca. 320, 370, and 450 Ma (Figure 17A and 19). Of particular interest is the comparison of samples BRK 698 and BRK 1971. The sample from the Pottsville Formation (BRK 698) and the one from the Parkwood Formation (BRK 1971) have nearly identical age distributions, except that the age modes are ca. 2-3 Ma older in the Parkwood sample.

Chapter 6 – Interpretations

6.1 Sandstone Analysis

Sandstones of the Brooks core are clearly more mature than those from the Hendrix core (Tables 1 and 2, and Figure 12 and 13). This difference may reflect the fact that the Brooks core sampled sequences further out in the basin and from stratigraphically lower units of the Pottsville Formation. Among all samples of this study, there is a broad distribution of sediment composition with quartz contents ranging between 46-92%, feldspar contents ranging between 2-13%, and lithic contents ranging between 5-41% (on a QtFL scale). Variations towards higher maturity occur between compositions of $Qt_{46}F_{13}L_{41}$ to $Qt_{92}F_2L_5$. This trend among all Brooks, Hendrix, and surface samples reveals that the sandstones are not likely sourced from drastically different areas.

The change in maturity with stratigraphic height in the Pottsville Formation could be related to changes in distance of transport from source areas. Johnsson et al. (1991) showed that sediment sourced from the Mérida Andes orogen can yield quartz arenite sands if the distance from the source is sufficiently large. Specifically, Johnsson et al. (1991) found that quartzose sands were derived from Andean sediment by erosional transport of ca. 1400 km by the Orinoco River through the Llanos basin. The deposition of the Pottsville Formation occurred when the Black Warrior basin was located in an equatorial region with vast plains bordering mountain regions, similar to the modern Llanos basin of South America. The more quartz-rich sandstones of the lower Pottsville (e.g., the basal quartz arenites of the Brooks core) may have been sourced from much further away than the less mature samples (assuming that chemical weathering rates were approximately equal). Thus, the quartz arenite composition of basal Pottsville sandstones does not only require that the source be dominated by quartz. Rather, it may indicate that the sediment was transported over a longer period of time and/or greater distance experiencing extensive weathering (in an equatorial climate) before final deposition, resulting in the loss of more labile grains.

The type and abundance of feldspar indicates important features of the source terranes for the sandstones of the Pottsville Formation. There is a paucity of potassium feldspar in these sandstones, and most have less than 5% potassium feldspar in total composition. Plagioclase feldspar, on the other hand, is present in every sample, and in abundance composing up to 20% of the total sandstone composition. The presence and abundance of plagioclase feldspar over potassium feldspar indicates a mafic rich environment, such that would yield the basalt granules seen in the conglomerate units. The absence of a significant portion of potassium feldspar could be due to high rates of weathering over large transport distances, but even in the conglomerate units potassium feldspar is not present in large quantities.

Analysis of rock fragment types and abundances also indicates important features of the source terrane. Variations of lithic fragment abundance tend towards high amounts of metamorphic and sedimentary lithic fragments. Igneous lithic fragments do not compose a significant proportion of the sandstone composition, but were a part of the source terrane, as the conglomerate units indicate. It is likely that igneous rock fragments were broken down into their mineral constituents during erosion and transport before final deposition, especially in samples from the Brooks core. In the Brooks core, igneous rock fragments are not present in nearly every sample, and are a small percentage (less than 2%) in samples that do contain them. This is likely due to large transport time for sandstones in the lower Pottsville Formation, and the removal of igneous fragments from the sediment. The same explanation can be applied to sedimentary lithic grains, which are in smaller proportion in the Brooks core than the Hendrix core. The more labile sedimentary rock fragments likely broke down into their individual mineral constituents before deposition.

Though many samples have experienced a large amount of weathering before deposition, the types and abundances of lithic fragments indicate that the source terrane for these sandstones contained large amounts of metamorphic, sedimentary, and igneous rocks. The abundance of feldspars and various types of labile lithic fragments in the immature sandstones of the upper Pottsville indicates that Pottsville sands were derived from a variety of source rocks in orogenic terranes and, in later stages of deposition, were not transported as far.

6.2 Conglomerate characterization

Quartz arenites in Mississippian strata of the Black Warrior basin have been largely interpreted to be sourced from the continental interior (Welch, 1978; Cleaves, 1983; Stapor and Cleaves 1992). The quartz clasts in the lower Pottsville, however, are probably sourced from the same terranes that yielded muscovite with Taconic and Acadian ages in associated sandstones (such as sample D2S3 from the Cahaba synclinorium and BRK 1914 from the Black Warrior basin). Conglomerate clasts from the base of the Pottsville Formation (collected in northeast Alabama, see Appendix 1 and Figure 2 for locations) are entirely quartzose in composition but likely were derived from the Appalachian orogeny to the northeast. The cratonic interior to the northwest or the nearby Southern Appalachians to the southeast or the Ouachita Mountains to the southwest likely can be excluded as source areas.

In contrast to the dominantly quartzose conglomerate clasts from the base of the Pottsville, conglomerate clasts in the upper Pottsville are more varied in composition. The metamorphic clasts in samples HDX 1114, 1112, and 1104 were derived dominantly from low-grade metasedimentary rocks comparable to the metasedimentary units of the Blue Ridge and Inner Piedmont terranes of the Southern Appalachians. Such low-grade metasedimentary rocks are common in the Western Blue Ridge (e.g., the Talladega belt), the Eastern Blue Ridge (e.g., the Tallulah Falls-Ashe Formation) and the Inner Piedmont (Hatcher et al., 2007 and references therein). This comparison is further supported by the geochronology of detrital muscovite. For example, sample HDX 1094 yielded Alleghenian (ca. 320 Ma) and Acadian (ca. 370 Ma) age modes, which are comparable to documented Alleghenian and Acadian muscovite ages for the Western Blue Ridge terrane of Georgia (Hames et al., 2007; MacDonald, 2008) and for metasedimentary and metavolcanic rocks of the Carolina Superterrane (Hibbard et al., 2012).

The abundance of reworked sedimentary clasts observed in the conglomerates of the upper Pottsville may reflect derivation of the material from the uplifted Valley and Ridge province of the southern Appalachians. During widescale thrusting related to the Alleghanian orogeny, sedimentary rocks in the Valley and Ridge were folded, faulted, uplifted, and exposed for erosion during the Upper Pennsylvanian. Since these conglomerate units are from the upper Pottsville, it is highly likely that the Valley and Ridge province had experienced some uplift and erosion by this time. Further evidence for this is provided by the chert clasts. On the whole, chert clasts in the upper Pottsville do not contain abundant relict fossil textures. However, those that do preserve fossiliferous textures (see Figure 15B) are similar to in chert from the Knox Group (Tobin, 2004). This is one of the strongest indicators that upper Pottsville sediments were derived from the southern Appalachians, including uplifted carbonates of the Knox Group.

Volcanic pebbles in conglomerates provide clues to possible source terrane. Two predominant types of volcanic pebbles are noted to occur in roughly equal abundances. Fine grained basalt with randomly oriented plagioclase phenocrysts with hopper texture resembles quenched basalt. These textures are common in underwater eruptions such as those in mid-ocean ridges, back-arc basins, or rift zones. Porphyritic rhyolite with twinned potassium feldspar phenocrysts in a fine-grained matrix commonly occurs in terranes associated with continental rifting or volcanic arcs along continental margins. Both basalts and rhyolites are common today in arc terranes with oceanic crust formed in back-arc rifts, and in areas of rifted continental crust where mafic magmatism promotes melting of granites and ensuing rhyolitic volcanism. The Taconic and Acadian orogenies included the accretion of volcanic arcs onto the Laurentian margin, including rocks of the back-arc basin ocean crust. Thus, a volcanic arc terrane may have been exposed and provided sediments to the foreland region of the Appalachians. Possible source rocks for these volcanic arc-derived clasts are the Cowrock and Cartoogechaye terrane sequences of the Central Blue Ridge, or the arc complex of the Carolina Superterrane (Hatcher et al., 2007; and references therein). Notably, igneous rocks in these terranes are metamorphosed whereas and the volcanic clasts in the Pottsville conglomerates are unmetamorphosed. Hence, if these clasts were sourced from the Blue Ridge and/or Carolina Superterrane, then these rocks must have been exposed at the surface before the widespread metamorphism of the Alleghanian orogenic event.

6.3 Detrital Geochronology

Samples from the Cahaba synclinorium have a variety of muscovite $^{40}Ar/^{39}Ar$ age distributions that reflect a very complex depositional and tectonic history. The lowermost sandstone sample from the Cahaba synclinorium contains muscovite largely from a Taconic age source, which is very similar to age distributions from the basal units of the Black Warrior basin. Samples from higher units (D2-S2 and higher) tend to lack a Taconic mode. Uddin et al. (in prep.) interpret these age variations to indicate that a tectonic event closed off Taconic (450 Ma) source rocks from the Cahaba basin transport system by the time of deposition of sample D2-S2. It is likely that sample D2-S3 from this study is sampled from the same depositional system as D2-S1, and that sample D2-S2 was deposited in a significantly different drainage system.

The Brooks core samples the basal contact of the Pottsville Formation in the Black Warrior basin. Samples of thick sandstones collected near the basal contact (BRK 1914, 1708, and 1004) are dominated by modes of 450 Ma ages, which reflect a Taconic source. An important feature of these samples is the absolute absence of any Alleghanian age muscovites. There are no crystals with ages less than 350 Ma in these 3 basal Pottsville samples. These data indicate that terranes dominated by Alleghanian aged muscovite (such as the southern Appalachians) did not provide a significant portion of the sediment (5% or more, c.f. Vermeesch, 2004) to the mature sandstones at the base of the Pottsville Formation. Higher stratigraphic samples (BRK 698-100) contain Alleghanian age material (ca. 320 Ma), and Taconic age material is absent in the detrital record of the highest samples (BRK 100 and BRK 354).

The Hendrix core penetrates only the upper Pottsville, and the stratigraphic relationship between the Brooks and Hendrix cores can be seen in Figure 20. All samples from the Hendrix core reflect dominant Alleghanian metamorphic ages in the detrital muscovite age distribution, but also reflect the addition of Acadian material of varying abundance. The Hendrix core samples are all very similar to those of the upper Pottsville units from the Brooks core. As Figure 20 shows, the samples from the bottom of the Hendrix core (HDX 4271 and 3527) are close stratigraphically to the samples from the top of the Brooks core (BRK 694 and 354). Samples BRK 698 and CHN are from the Mary Lee coal zone and HDX 4271 is from the Ream coal zone, and these samples mark an important change in the age distribution of detrital muscovite in the Pottsville Formation. Samples from units stratigraphically lower than this transition (i.e., lower than BRK 698) are dominated by Taconic age metamorphic mica, and samples above are dominated by Alleghanian metamorphic mica.

One sample (BRK 1971) from the Parkwood Formation in the Brooks core was also analyzed in this study. This sample shows an age distribution pattern nearly identical to sample BRK 698 from the Pottsville Formation, which is over 1200 feet higher in the section. Each of the three major age modes for this Parkwood sample correspond to known Appalachian orogenic events, specifically the Alleghanian, Neo-Acadian/Acadian, and Taconic orogenies. This observation could be indicative of two fundamental characteristics for the Black Warrior Basin: (1) that the Pottsville and

Parkwood Formations are not vastly different sedimentary units, and (2) the Formations comprise strata deposited within the same depositional system with the same orogenic source terranes. Assuming the Parkwood and Pottsville Formations contain sediment from similar sources, the fact that age modes of the younger Pottsville sample (BRK 698) are ca. 2-5 m.y. older than those of the Parkwood sample (BRK 1971) may reflect differential unroofing of Appalachian source terranes during this stratigraphic interval.

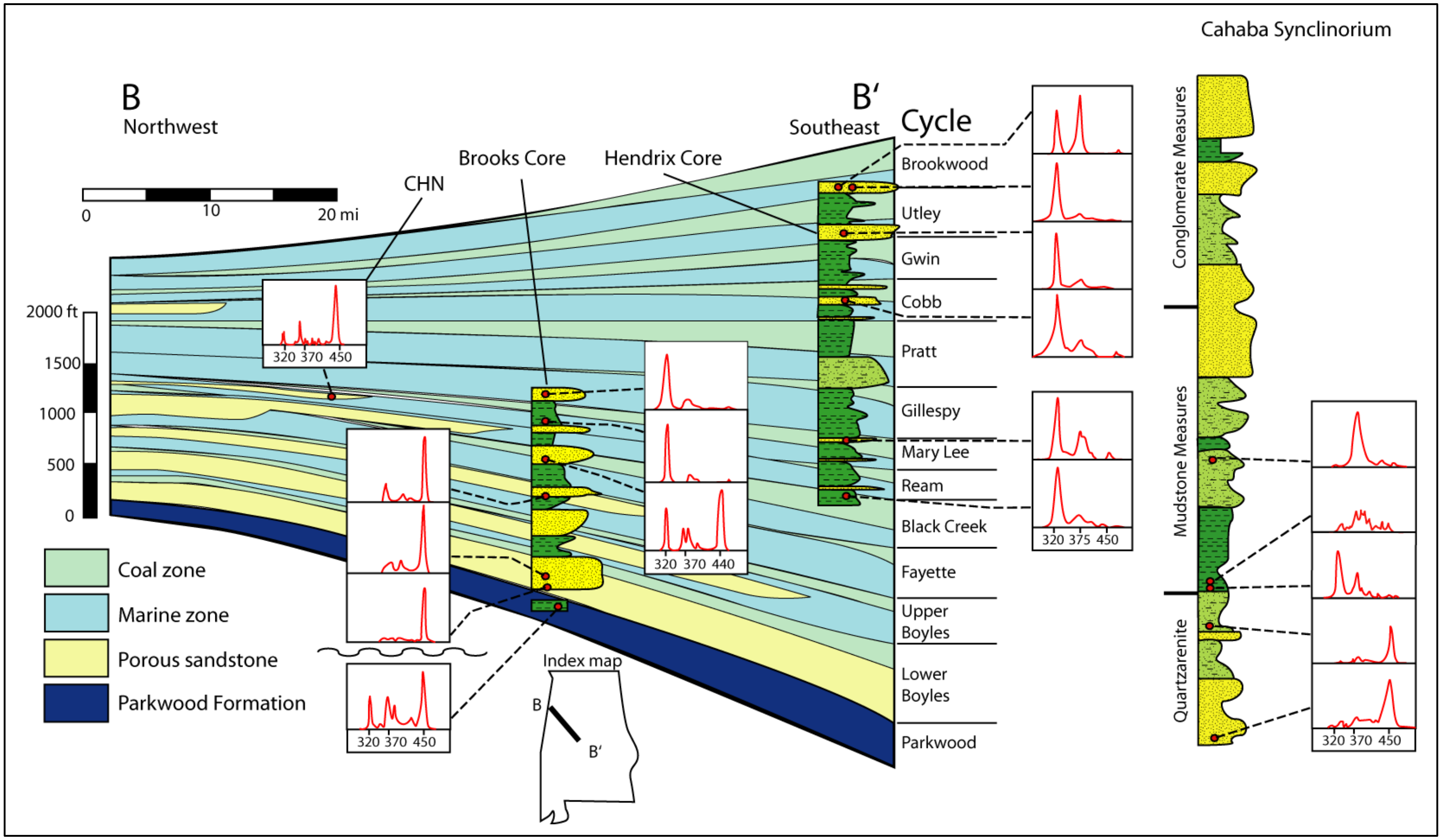

Figure 20. Cross section (adapted from Pashin, 1994) showing the relationship between the stratigraphy of the Black Warrior basin, locations of the two cores used in this study, and outcrop samples (CHN and Cahaba). The Cahaba synclinorium stratigraphy is shown on the right, as well as the locations and plots of detrital muscovite from all 5 samples. The wavy line separates samples from the Pottsville and the Parkwood Formation, and represents an unconformity at the base of the Pottsville.

Chapter 7 – Discussion

7.1 Large-Scale Depositional Controls

The base of the Pottsville Formation (Boyles Sandstone in the BWB, and Shades Sandstone of the Cahaba synclinorium) is dominated by very mature quartzose sediment. The relatively high maturity of this sediment may have been controlled by transport distance, assuming that chemical weathering rates were similar throughout the time of Pottsville deposition (Dickinson, 1985; Johnsson et al., 1991). Through time, sites of deposition of quartz arenite sandstones migrated away from the depocenter. This was largely due rising sea-level, the landward retreat of the large Pennsylvanian river system, and increased supply of sediments from the nearby Appalachian Mountains.

The quartz arenites from the base of the Pottsville Formation in the Black Warrior basin and Cahaba synclinorium were likely deposited by an ancient river system similar to that proposed by Archer and Greb (1995; Figure 21A). This river system may be a continuation of the one that deposited Mississippian clastic sediments in the Black Warrior basin (Welch, 1978; Cleaves, 1983; Cleaves and Bat, 1988; Stapor and Cleaves, 1992). The higher textural and compositional maturity of sands from the base of the Brooks core indicates that those sediments travelled a greater distance, perhaps on the order of 1400 km, before final deposition in the Black Warrior Basin. This distance is consistent with the Andean-scale ancient river system of the Pennsylvanian proposed by Archer and Greb (1995) and the characteristics of sediment in a modern Andean system (Johnsson et al., 1991). A distance of 1400 km that Johnsson et al. (1991) document for production of arenitic sands (~1400 km) in the modern Llanos basin is comparable to that

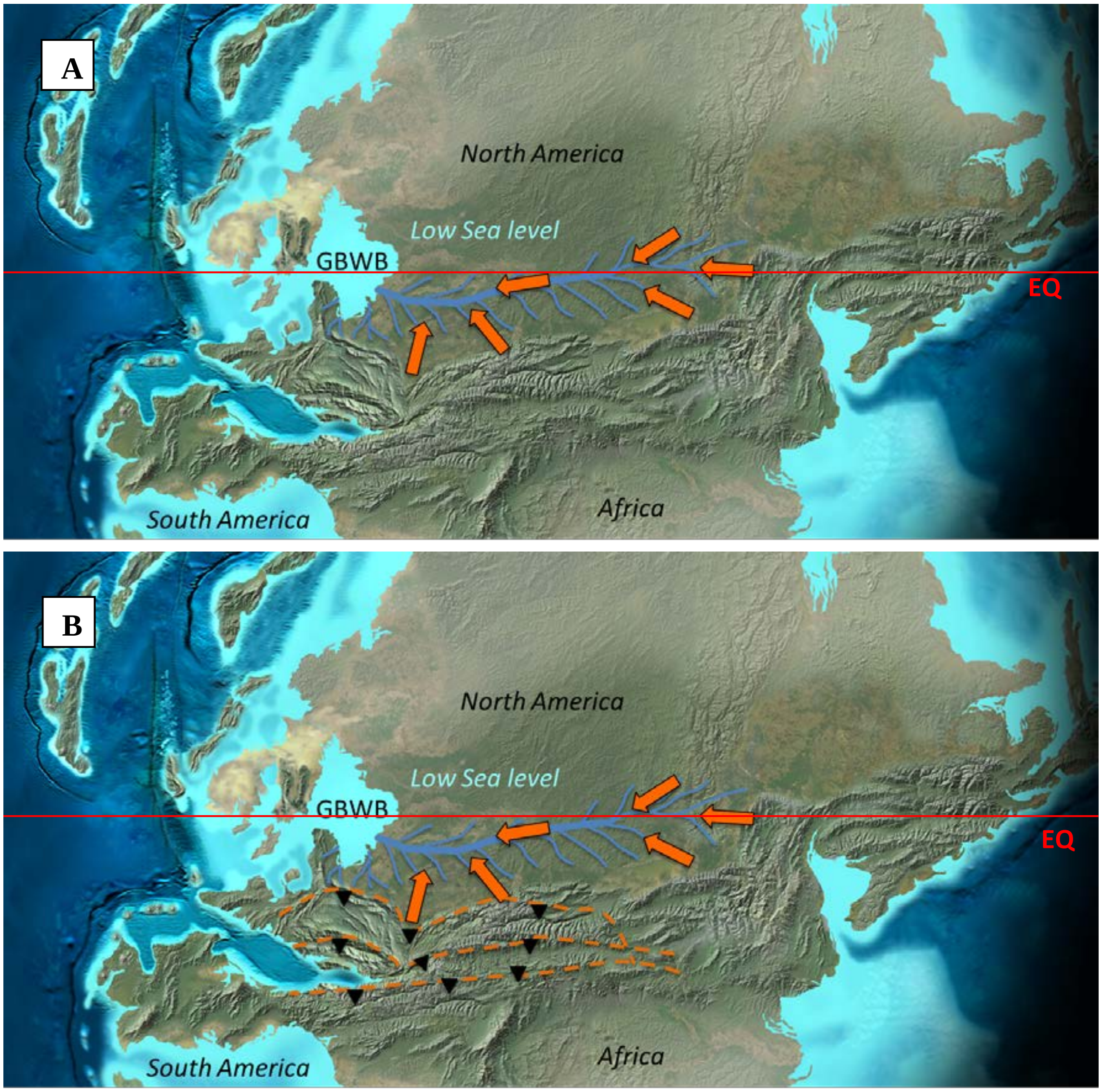

Figure 21. Depictions of paleogeography of Pangea at ca. 300 Ma (from R. Blakey, Colorado Plateau Geosystems Inc.) with the longitudinal (east to west) and transverse (south to north) drainage as suggested by Archer and Greb (1995). Sediment was derived from the Appalachian Mountains, and longitudinal rivers transported sediment from the northern and central Appalachians during the early depositional history of the Pottsville Formation (A). Later, thrusting and reactivation of previous faults and sutures created large amounts of Alleghanian aged metamorphic muscovite (B), particularly in the southern Appalachians.

from the Black Warrior basin depocenter to the Taconic Range of the New England Appalachians, and the equatorial climate of the Carboniferous Appalachians was presumably comparable to that of the Andean system. Notably, the incised valley fills of the basal Pennsylvanian sandstones (Lee, Bloyd, and Sharon) in the northern Appalachians have very similar compositions to these quartz arenites. Moreover, the detrital muscovite age signature is dominantly ca. 450 Ma in all quartz arenites from the lower Pottsville Formation. If southern Appalachian terranes were providing significant amounts of the sediment at this time, abundant muscovite of Alleghanian age would be expected. The absence of such muscovite is compatible with a source region that generally lacked abundant Alleghanian metamorphic rocks. The central and northern Appalachians were a likely source for the lower quartz arenite samples of the Brooks core. Source rocks in this area could include the Highlandcroft Plutonic Suite, the Oliverian plutonic series, and the metamorphic rocks of the Taconic Range in the northern Appalachians and the Wilmington Complex and Glenarm Supergroup in the Central Appalachians (e.g., Drake et al., 1989).

The lower and upper Pottsville Formation are as clearly distinct in compositional and textural maturity as well as in detrital muscovite age signature. While the lower Pottsville samples are dominantly mature quartzose sediments containing muscovite of Taconic age, the upper Pottsville samples are immature litharenites containing muscovite of Alleghanian age. A transition between these muscovite signatures occurs at a stratigraphic level coincident with the Black Creek to Mary Lee coal zones. Sample BRK 698 exemplifies this transition; it has a composition of $Qt_{80}F_{10}L_{10}$ and is less mature than the quartz arenites of subjacent strata. The detrital muscovite age signature of BRK

698 could be considered as a summation of ages for samples above and below, with modes representing all three Appalachian orogenic events clearly defined. This sample is interpreted here to mark the transition of coarse mature sediment derived from the northern Appalachians and deposited by an extensive, longitudinal Pennsylvanian river system to less mature sediment deposited in a deltaic clastic wedge fed by transverse drainages that brought sediment from the southern Appalachians. This is a large scale change in the depositional history of the Pottsville Formation, and could reflect pervasive Alleghanian orogenesis in the present-day southern Appalachians.

Samples collected from the upper Pottsville Formation (Black Creek – Brookwood coal zones; BRK 354 & 100, and all HDX samples) are texturally and compositionally immature. Since the Black Warrior basin was located near the equator during Lower Pennsylvanian (Figure 7 and 21), weathering rates were high enough to remove unstable mineral species given a significant time period to do so. The immature sediments in the upper Pottsville suggests a proximal source, such as the southern Appalachians. Notably, the detrital muscovite age signature from the upper Pottsville is dominated by Alleghanian aged mica, which is abundant in the southern Appalachian Mountains (Dallmeyer et al., 1978; Hames et al., 2007; McDonald, 2008; Hibbard et al., 2012). The character of conglomerates in the upper Pottsville is also consistent with this conclusion, since many of the clast types are very similar to rock units found in the western portions of the southern Appalachians. These observations strongly suggest derivation of the upper Pottsville Formation from the nearby southern Appalachians, rather than from a more distal northern source.

7.2 A Test of the Preferred Hypothesis

To test the hypothesis outlined above and illustrated in Figure 21, a sample of litharenite (BRK 1056) was selected from a coarsening upward sequence in the lower part of the Brooks core (at a depth of 1056 feet). Initial sampling and analysis (Figure 19) showed that quartz arenites (BRK 1708 and BRK 1004) bracketing this litharenite are dominated by Taconic muscovite, presumably derived from a northern Appalachian source as discussed previously. The results for BRK 1056 and the bracketing quartz arenites are shown in Figure 22. The detrital muscovite ages of BRK 1056 indicate a dominant Alleghanian source for the muscovite in the sample of litharenite, in contrast sharply to the samples above and below dominated by Taconic muscovite. The age distributions in the litharenite sample BRK 1056 are similar to the age distributions of litharenites from higher in the Brooks core and the Hendrix core (e.g.. BRK 354, 100 and most HDX samples; see Figures 18-20).

This is interpreted to indicate that this sample was derived from the same southern Appalachian deltaic system as the higher stratigraphic samples. In turn, this indicates competing, alternating depositional systems existed in the Black Warrior basin during Lower Pennsylvanian. Therefore, the hypothesis outlined and represented in Figure 22, that emphasized broad-scale Alleghanian tectonic control, should be modified. Figure 23 contains essentially the same scale and distribution of drainages as Figure 22. However, it considers changes in sediment supply to the BWB that accompanied sea-level changes, such as that discussed by Greb et al. (2008). During low sea-level stands (Figure 23A), as would accompany glacial stages, far-travelled sediment from longitudinal drainages

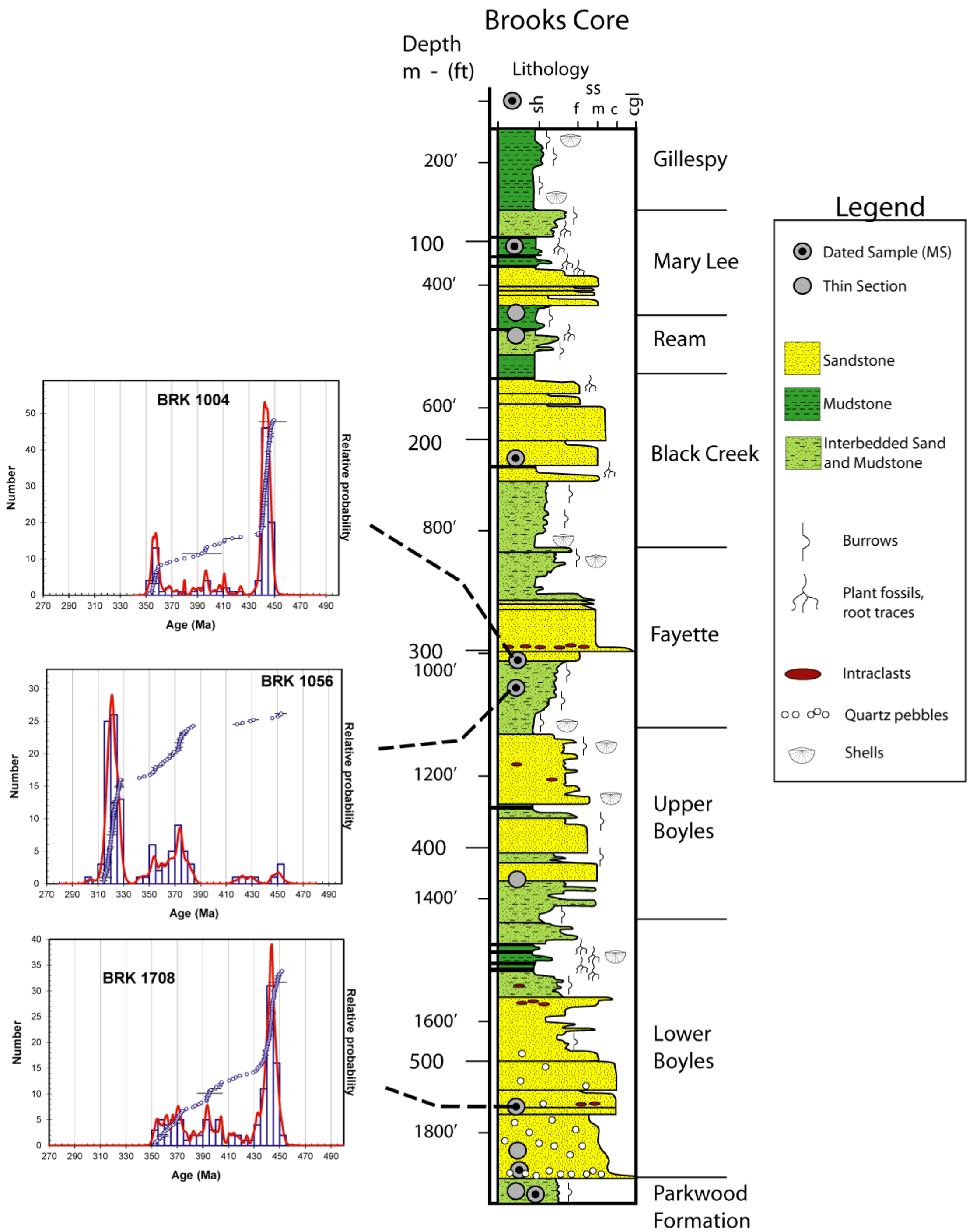

Figure 22. Lithic sandstone sample BRK 1056 showing variation of detrital muscovite age signature compared to bracketing quartz arenite samples BRK 1708 and BRK 1004. Coal zones are indicated to the right of the stratigraphic column.

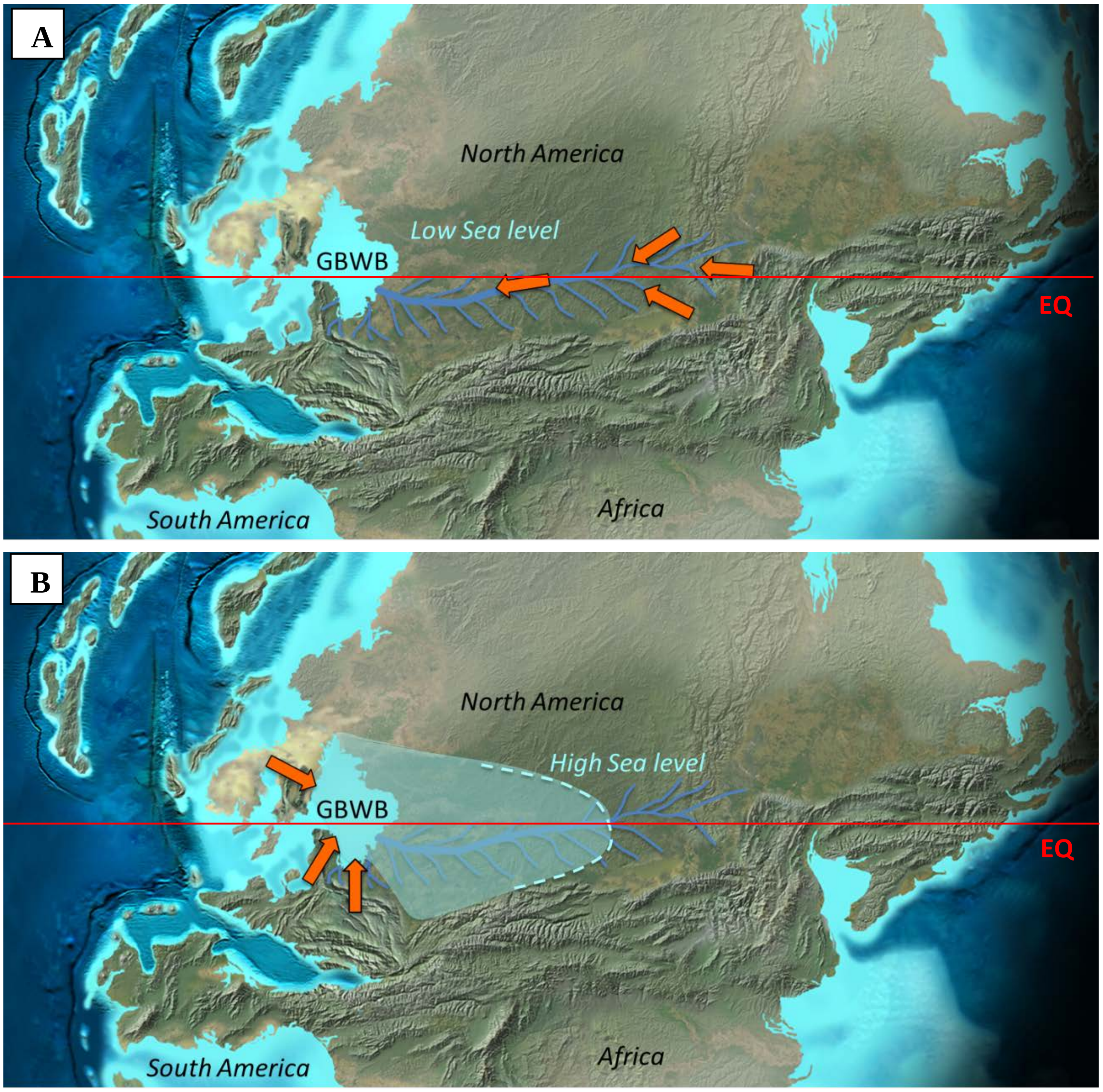

Figure 23. Paleogeographic maps as in Figure 21 with additions to demonstrate inferred variations in depositional systems related to sea level change. The GBWB receives sediment from the Pennsylvanian river system sourcing the northern Appalachians during low sea levels (A). During high sea-levels, the river system is effectively cut off from the GBWB and deltaic sedimentation with local sources dominate (B).

could be transported to the GBWB. During high sea-level stands associated with interglacial stages, the supply of far-travelled sediment may have been interrupted by the encroaching seaway, such that sediment from local sources and transported by deltaic systems was more effectively deposited in the BWB. This explains the differences seen between sample BRK 1978 from the Parkwood Formation that contains dominantly Alleghenian age muscovite and sample BRK 1914 from the Pottsville Formation that contains dominantly Taconic age muscovite.

Viewed collectively, the geochronologic and compositional data from the present study indicate changes in sediment source region due to short-term eustatic sea-level cycles (c.f. the differences observed in detrital muscovite age between the litharenite and quartz arenites, Figure 22) that are superimposed upon broad scale changes in source regions that seem to be due to tectonic control (the transition from Taconic to Alleghanian-Acadian detrital muscovite ages for coarse sandstones from the lower to the upper Pottsville Formation, shown in Figure 20).

Chapter 8 – Conclusions

Study of sandstone modal mineralogy, conglomerate clast type, and detrital muscovite age distributions of samples from the Pottsville Formation result in new data bearing on the character of the Appalachian foreland region during the Lower Pennsylvanian. The lower Pottsville Formation contains thick sequences of quartz arenites interpreted to have been deposited by an Amazon/Ganges-scale river system originating in the northern Appalachians. These sediments are texturally and compositionally mature, plotting in or near the craton provenance field, and contain muscovite dominated by ca. 450 Ma Taconic ages. These sediments are interpreted to have been deposited during the lowstand conditions of the Lower Pennsylvanian and were sourced from rocks of the northern Appalachians (e.g., the Taconic Range). The upper Pottsville Formation, in contrast, contains thick sequences of muddier, lithic sands deposited by a deltaic system draining the southern Appalachians. These sediments are texturally and compositionally immature, plotting in the recycled orogen provenance field, and contain dominantly Alleghanian and Acadian age muscovite. Clasts within conglomerates from the upper Pottsville are similar to rocks of the Blue Ridge-Piedmont terranes and to sedimentary units of the Valley and Ridge, and are interpreted to have been sourced from those units.

In addition to these large-scale differences between the upper and lower Pottsville, smaller scale differences are found within relatively short stratigraphic intervals of the lower Pottsville. A sample of litharenite sandstone contains detrital muscovite of mostly Alleghanian and Acadian age and is bracketed by two samples of quartz arenite that yield muscovite of mostly Taconic age. This result is remarkable, considering that these samples with obviously different sources occur within a small stratigraphic range. On the basis of this result and discussions provided, the quartz arenites of the lower Pottsville are inferred to derive from the northern Appalachians that records Taconian orogenesis, while the litharenites likely derived from more local sources—the southern Appalachians and perhaps the Ouachitas—that are dominated by Alleghanian muscovite. Thus, even at small scales, the Pottsville varies stratigraphically in ways consistent with profound changes in sediment sources.

Coarse quartz arenitic sands from the bottom of the Pottsville Formation in the Cahaba synclinorium are dominated by a Taconic signal, and higher sections of the Pottsville Formation comprise finer-grained and less mature sands with prominent Acadian and Alleghanian age modes (considering data from Peavy, 2008, and two additional samples of the present study). The processes described above that explain differences in sediments of the Black Warrior Basin were also likely responsible for differences in sediment composition and detrital muscovite age observed in the Cahaba synclinorium.

The integration of detrital muscovite $^{40}Ar/^{39}Ar$ age, sedimentological and stratigraphic data in the present study offers a powerful approach to the characterization and interpretation of sandstone provenance and basin evolution. The present study offers a series of Carboniferous views of changing Laurussian paleogeography and the collision with Gondwana that led to formation of Pangea. Pottsville detrital sediments record the existence of rocks and sequences that largely have been lost by erosion or covered by younger strata over the ensuing 300 million years. The present study emphasizes changes in supply of sediments to the Black Warrior Basin from multiple sources that include

Alleghanian terranes that developed earlier and with greater intensity in the southern Appalachians, Acadian terranes that composed a significant part of the southern Appalachians, and Taconic terranes of the northern Appalachians. The large-scale tectonic changes of the Carboniferous were accompanied by large-scale changes in riverine sediment supply systems, from Amazon/Ganges scale longitudinal rivers (that arguably exceeded 1000 km in length) to more localized deltaic systems, that were controlled in part by changes in sea-level.

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Appendix 1

Sample Name	Latitude	Longitude
Hendrix Core	W 87° 37.17’	N 33° 2.148’
Brooks Core	W 87° 22.056’	N 33° 37.056’
GA 1	W 85° 29.312’	N 34° 30.599’
GA 2	W 85° 29.312’	N 34° 30.599’
GA 3	W 85° 29.324’	N 34° 30.643’
GA 4	W 85° 29.507’	N 34° 30.737’
DS 1	W 85° 41.255’	N 34° 27.132’
DS 2	W 85° 41.215’	N 34° 27.083’
DS 3	W 85° 41.197’	N 34° 27.071’
NF 1	W 86° 01.708’	N 34° 03.544’
NF 2	W 86° 01.708’	N 34° 03.544’
NF 3	W 86° 01.658’	N 34° 03.501’
GDN 1	W 86° 03.606’	N 34° 02.361’
GDN 2	W 86° 03.606’	N 34° 02.361’
GDN 3	W 86° 03.606’	N 34° 02.361’
GDN 4	W 86° 04.020’	N 34° 01.526’
OH 1	W 85° 54.261’	N 34° 05.866’
OH 2	W 85° 54.226’	N 34° 05.853’
OH 3	W 85° 57.640’	N 34° 04.258’
ST 1	W 86° 14.767’	N 33° 55.887’
ST 2	W 86° 14.724’	N 34° 55.723’
ST 3	W 86° 14.724’	N 34° 55.723’
CHN	W 87° 31.38’	N 33° 55.386’
Allen	W 88° 40.02’	N 33° 34.26’
D2S1	W 86° 47.28’	N 33° 25.8’
D2S2	W 86° 48.12’	N 33° 22.5’
D2S3	W 86° 52.08’	N 33° 20.55’
D2S4	W 86° 53.52’	N 33° 17.37’

Samples were collected in the state, near the town, or on the road indicated by the sample names: GA = Georgia; DS= Desoto,AL; NF = Nocalula Falls, AL; GDN = Gadsden, AL; OH = Owls Hollow (road); ST = Steele, AL; CHN = Carbon Hill, Nauvoo, AL. Latitude and Longitude for samples D2S1, D2S2, D2S3, and D2S4 were approximated using Google Earth© and directions from Pashin and Carroll (1999).

Appendix

Samples were irradiated in the (1) McMaster Nuclear Reactor at Hamilton University in Ontario, Canada (Samples with prefix au18 and au16) and (2) the US Geological Survey TRIGA reactor in Denver, CO (samples with prefix au21), with cadmium shielding. Synthetic CaF2 was included with the irradiation to determine calcium production factors, and Fish canyon sanidine (from an aliquot prepared at New Mexico Tech) was used to monitor production of 39ArK, with an assigned age of 28.02 Ma (Renne et al., 1998). Radial variations in J-value for the irradiation package of these samples were found to be negligible, with the result that for four monitors positions in each layer of the irradiation package were averaged to determine the J-values. Aliquots of air from an air pipette were measured daily to evaluate mass discrimination, and procedural blanks were measured following every five analyses of unknowns. Samples were analyzed following gas extraction with a CO2 laser using an automated extraction line, with data collection on an electron multiplier detector. Date presented are in volts unless otherwise indicated, and are corrected for backgrounds, mass discrimination, and decay of short-lived isotopes.

au18.3g.mus (HDX 566) Mitchell Moore *j=0.016395±0.000054 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
Blank	0.02755 + 0.00018	0.00027 + 0.00009	0.00003 + 0.00002	0.00028 + 0.00005	0.00015 + 0.00002					
1	2.12317 ± 0.00271	0.14402 ± 0.00029	0.00174 ± 0.00007	0.00108 ± 0.00008	0.000124 ± 0.000025	1.49E-14	98.3	14.48782	384.5 ± 1.7	0.43%
2	6.06104 ± 0.00434	0.50999 ± 0.00154	0.00620 ± 0.00006	0.00106 ± 0.00008	0.000082 ± 0.000024	4.24E-14	99.6	11.83722	320.0 ± 1.1	0.33%
3	9.66523 ± 0.00291	0.82373 ± 0.00108	0.01004 ± 0.00010	0.00172 ± 0.00008	0.000082 ± 0.000024	6.77E-14	99.8	11.70418	316.7 ± 0.5	0.15%
4	5.55270 ± 0.00424	0.45449 ± 0.00105	0.00554 ± 0.00006	0.00159 ± 0.00008	0.000177 ± 0.000028	3.89E-14	99.1	12.10266	326.5 ± 0.9	0.29%
5	3.63178 ± 0.00341	0.26049 ± 0.00053	0.00313 ± 0.00007	0.00109 ± 0.00009	0.000064 ± 0.000029	2.54E-14	99.5	13.86944	369.6 ± 1.2	0.33%
6	8.04327 ± 0.00665	0.57949 ± 0.00123	0.00710 ± 0.00008	0.00367 ± 0.00012	0.000101 ± 0.000027	5.63E-14	99.6	13.82902	368.7 ± 0.9	0.25%
7	3.07241 ± 0.00223	0.21813 ± 0.00032	0.00260 ± 0.00007	0.00154 ± 0.00011	0.000088 ± 0.000026	2.15E-14	99.2	13.96650	372.0 ± 1.1	0.30%
8	5.43323 ± 0.00377	0.38346 ± 0.00134	0.00477 ± 0.00007	0.00128 ± 0.00006	0.000473 ± 0.000048	3.81E-14	97.4	13.80495	368.1 ± 1.7	0.45%
9	4.76628 ± 0.00311	0.34020 ± 0.00056	0.00408 ± 0.00007	0.00112 ± 0.00009	0.000056 ± 0.000023	3.34E-14	99.7	13.96174	371.9 ± 0.9	0.23%
10	2.39778 ± 0.00203	0.19921 ± 0.00073	0.00241 ± 0.00007	0.00083 ± 0.00011	0.000004 ± 0.000028	1.68E-14	100.0	12.03136	324.8 ± 1.7	0.51%
11	4.53289 ± 0.00570	0.11135 ± 0.00042	0.00328 ± 0.00008	0.00125 ± 0.00007	0.009859 ± 0.000100	3.17E-14	35.7	14.54559	385.9 ± 8.7	2.25%
12	3.30487 ± 0.00240	0.27515 ± 0.00067	0.00334 ± 0.00005	0.00169 ± 0.00010	0.000131 ± 0.000029	2.31E-14	98.8	11.87065	320.8 ± 1.2	0.37%
13	6.74540 ± 0.00310	0.57055 ± 0.00133	0.00691 ± 0.00006	0.00051 ± 0.00010	0.000169 ± 0.000028	4.72E-14	99.3	11.73548	317.5 ± 0.9	0.27%
14	8.99999 ± 0.00571	0.60539 ± 0.00078	0.00736 ± 0.00011	0.00233 ± 0.00012	0.000237 ± 0.000026	6.30E-14	99.2	14.75117	390.8 ± 0.7	0.17%
15	4.10721 ± 0.00250	0.35038 ± 0.00085	0.00412 ± 0.00006	0.00124 ± 0.00013	0.000076 ± 0.000031	2.88E-14	99.5	11.65798	315.5 ± 1.1	0.34%
16	2.54037 ± 0.00208	0.18137 ± 0.00061	0.00211 ± 0.00006	0.00140 ± 0.00008	0.000060 ± 0.000028	1.78E-14	99.3	13.90998	370.6 ± 1.8	0.48%
17	9.75266 ± 0.00489	0.82466 ± 0.00172	0.01002 ± 0.00008	0.00176 ± 0.00013	0.000095 ± 0.000024	6.83E-14	99.7	11.79252	318.9 ± 0.7	0.23%
18	11.85977 ± 0.01535	0.99097 ± 0.00198	0.01246 ± 0.00016	0.00396 ± 0.00009	0.000192 ± 0.000040	8.31E-14	99.5	11.91098	321.8 ± 0.8	0.26%
19	4.39777 ± 0.00377	0.32546 ± 0.00076	0.00388 ± 0.00005	0.00445 ± 0.00013	-0.000002 ± 0.000026	3.08E-14	100.0	13.51389	361.0 ± 1.1	0.30%
20	4.75507 ± 0.00434	0.40168 ± 0.00084	0.00488 ± 0.00005	0.00083 ± 0.00008	0.000075 ± 0.000024	3.33E-14	99.5	11.78301	318.6 ± 0.9	0.27%
21	8.92043 ± 0.00248	0.63962 ± 0.00099	0.00781 ± 0.00008	0.00270 ± 0.00007	0.000088 ± 0.000028	6.25E-14	99.7	13.90626	370.5 ± 0.7	0.18%
22	3.00205 ± 0.00266	0.25244 ± 0.00078	0.00300 ± 0.00008	0.00258 ± 0.00015	0.000016 ± 0.000051	2.10E-14	99.9	11.87478	320.9 ± 1.9	0.60%
23	5.42083 ± 0.00481	0.45707 ± 0.00064	0.00581 ± 0.00010	0.00107 ± 0.00011	0.000073 ± 0.000029	3.80E-14	99.6	11.81288	319.4 ± 0.7	0.23%
24	6.03497 ± 0.00357	0.50479 ± 0.00047	0.00602 ± 0.00007	0.00626 ± 0.00016	0.000145 ± 0.000026	4.23E-14	99.3	11.87148	320.8 ± 0.5	0.17%

25	5.86916 ± 0.00383	0.48806 ± 0.00083	0.00598 ± 0.00011	0.00141 ± 0.00010	0.000180 ± 0.000028	4.11E-14	99.1	11.91665	322.0 ± 0.7	0.23%
26	6.90142 ± 0.00290	0.50239 ± 0.00067	0.00605 ± 0.00008	0.00070 ± 0.00009	0.000105 ± 0.000028	4.83E-14	99.6	13.67551	365.0 ± 0.7	0.19%
27	3.46336 ± 0.00230	0.25132 ± 0.00072	0.00303 ± 0.00007	0.00188 ± 0.00006	0.000021 ± 0.000028	2.43E-14	99.8	13.75682	366.9 ± 1.4	0.38%
28	2.41326 ± 0.00289	0.20242 ± 0.00064	0.00248 ± 0.00007	0.00067 ± 0.00010	0.000015 ± 0.000028	1.69E-14	99.8	11.89994	321.5 ± 1.6	0.49%
29	2.59154 ± 0.00199	0.18407 ± 0.00056	0.00215 ± 0.00008	0.00039 ± 0.00008	0.000089 ± 0.000030	1.81E-14	99.0	13.93735	371.3 ± 1.8	0.47%
30	2.17944 ± 0.00305	0.18269 ± 0.00075	0.00248 ± 0.00009	0.00165 ± 0.00016	0.000058 ± 0.000027	1.53E-14	99.2	11.83584	320.0 ± 1.8	0.57%
31	1.65042 ± 0.00283	0.13924 ± 0.00049	0.00163 ± 0.00007	0.00081 ± 0.00006	-0.000165 ± 0.000055	1.16E-14	103.0	11.85330	320.4 ± 3.4	1.06%
32	2.98853 ± 0.00270	0.21814 ± 0.00052	0.00259 ± 0.00007	0.00260 ± 0.00009	0.000208 ± 0.000040	2.09E-14	97.9	13.41891	358.7 ± 1.7	0.48%
33	3.57676 ± 0.00309	0.25328 ± 0.00056	0.00317 ± 0.00006	0.00069 ± 0.00005	0.000156 ± 0.000038	2.50E-14	98.7	13.94020	371.3 ± 1.5	0.40%
34	3.61515 ± 0.00182	0.26055 ± 0.00057	0.00305 ± 0.00007	0.00047 ± 0.00010	0.000301 ± 0.000038	2.53E-14	97.5	13.53433	361.5 ± 1.4	0.39%
35	4.32943 ± 0.00412	0.30793 ± 0.00069	0.00376 ± 0.00007	0.00503 ± 0.00013	0.000157 ± 0.000050	3.03E-14	98.9	13.91040	370.6 ± 1.6	0.42%
36	3.73547 ± 0.00206	0.27765 ± 0.00110	0.00342 ± 0.00007	0.00063 ± 0.00011	0.000240 ± 0.000041	2.62E-14	98.1	13.19807	353.4 ± 1.9	0.53%
37	1.99853 ± 0.00227	0.16656 ± 0.00074	0.00209 ± 0.00006	0.00162 ± 0.00010	0.000067 ± 0.000032	1.40E-14	99.0	11.88123	321.1 ± 2.1	0.67%
38	7.90644 ± 0.00453	0.54763 ± 0.00104	0.00661 ± 0.00008	0.00202 ± 0.00009	0.000409 ± 0.000030	5.54E-14	98.5	14.21685	378.0 ± 0.9	0.23%
39	4.28403 ± 0.00302	0.36138 ± 0.00084	0.00435 ± 0.00008	0.00183 ± 0.00005	0.000061 ± 0.000029	3.00E-14	99.6	11.80490	319.2 ± 1.0	0.32%
40	4.47331 ± 0.00322	0.32356 ± 0.00067	0.00394 ± 0.00006	0.00145 ± 0.00008	0.000149 ± 0.000028	3.13E-14	99.0	13.68945	365.3 ± 1.1	0.29%
41	5.76310 ± 0.00550	0.48719 ± 0.00096	0.00587 ± 0.00007	0.00203 ± 0.00011	0.000189 ± 0.000033	4.04E-14	99.0	11.71493	317.0 ± 0.9	0.28%
42	3.25913 ± 0.00208	0.23982 ± 0.00066	0.00288 ± 0.00004	0.00112 ± 0.00011	0.000071 ± 0.000027	2.28E-14	99.4	13.50302	360.8 ± 1.3	0.37%
43	2.43894 ± 0.00164	0.17408 ± 0.00050	0.00235 ± 0.00010	0.00115 ± 0.00012	0.000158 ± 0.000050	1.71E-14	98.1	13.74255	366.6 ± 2.5	0.68%
44	4.83331 ± 0.00441	0.39329 ± 0.00068	0.00486 ± 0.00006	0.00123 ± 0.00013	0.000163 ± 0.000049	3.38E-14	99.0	12.16708	328.1 ± 1.2	0.36%
45	15.62961 ± 0.00445	0.89384 ± 0.00133	0.01101 ± 0.00010	0.00500 ± 0.00012	0.000206 ± 0.000038	1.09E-13	99.6	17.41836	453.2 ± 0.8	0.17%
46	3.24082 ± 0.00203	0.27274 ± 0.00059	0.00326 ± 0.00008	0.00257 ± 0.00011	0.000115 ± 0.000045	2.27E-14	99.0	11.75895	318.0 ± 1.5	0.47%
47	3.20106 ± 0.00161	0.26357 ± 0.00071	0.00330 ± 0.00006	0.00155 ± 0.00011	0.000114 ± 0.000027	2.24E-14	99.0	12.01782	324.5 ± 1.2	0.38%
48	8.08585 ± 0.00602	0.60201 ± 0.00125	0.00747 ± 0.00008	0.00305 ± 0.00013	0.000191 ± 0.000029	5.66E-14	99.3	13.33827	356.8 ± 0.9	0.25%
49	2.17876 ± 0.00169	0.17705 ± 0.00051	0.00233 ± 0.00008	0.00122 ± 0.00008	0.000206 ± 0.000026	1.53E-14	97.2	11.96210	323.1 ± 1.5	0.48%
50	3.44709 ± 0.00213	0.24487 ± 0.00045	0.00309 ± 0.00006	0.00057 ± 0.00009	0.000112 ± 0.000026	2.41E-14	99.0	13.94198	371.4 ± 1.1	0.30%
51	10.32739 ± 0.00548	0.73651 ± 0.00093	0.00914 ± 0.00009	0.00319 ± 0.00007	0.000247 ± 0.000027	7.23E-14	99.3	13.92359	370.9 ± 0.6	0.16%
52	6.20303 ± 0.00325	0.51373 ± 0.00110	0.00612 ± 0.00007	0.00117 ± 0.00008	0.000242 ± 0.000027	4.34E-14	98.9	11.93572	322.4 ± 0.8	0.26%
53	7.75145 ± 0.00436	0.56489 ± 0.00093	0.00699 ± 0.00012	0.00500 ± 0.00017	0.000108 ± 0.000032	5.43E-14	99.6	13.66637	364.7 ± 0.8	0.21%
54	4.67707 ± 0.00295	0.33254 ± 0.00065	0.00396 ± 0.00008	0.00259 ± 0.00013	0.000000 ± 0.000030	3.28E-14	100.0	14.06524	374.3 ± 1.0	0.28%
55	6.79906 ± 0.00382	0.50813 ± 0.00096	0.00616 ± 0.00009	0.00196 ± 0.00015	0.000000 ± 0.000028	4.76E-14	100.0	13.38095	357.8 ± 0.8	0.23%
56	11.54809 ± 0.00705	0.83893 ± 0.00125	0.00973 ± 0.00017	0.00436 ± 0.00008	0.000195 ± 0.000042	8.09E-14	99.5	13.69719	365.5 ± 0.7	0.19%
57	5.19515 ± 0.00375	0.35773 ± 0.00061	0.00464 ± 0.00012	0.00187 ± 0.00014	0.000129 ± 0.000029	3.64E-14	99.3	14.41620	382.8 ± 1.0	0.25%
58	1.38180 ± 0.00172	0.09845 ± 0.00044	0.00131 ± 0.00007	0.00071 ± 0.00006	0.000096 ± 0.000025	9.68E-15	97.9	13.74765	366.7 ± 2.7	0.73%
59	1.98423 ± 0.00163	0.13722 ± 0.00053	0.00161 ± 0.00006	0.00040 ± 0.00008	0.000078 ± 0.000026	1.39E-14	98.8	14.29338	379.8 ± 2.1	0.56%
60	8.76493 ± 0.00414	0.62848 ± 0.00109	0.00764 ± 0.00007	0.00239 ± 0.00009	0.000112 ± 0.000026	6.14E-14	99.6	13.89387	370.2 ± 0.7	0.20%
61	4.73414 ± 0.00291	0.40368 ± 0.00136	0.00482 ± 0.00010	0.00081 ± 0.00011	0.000145 ± 0.000028	3.32E-14	99.1	11.62181	314.6 ± 1.2	0.39%
62	4.05415 ± 0.00284	0.23491 ± 0.00098	0.00287 ± 0.00005	0.00086 ± 0.00008	0.000129 ± 0.000029	2.84E-14	99.1	17.09609	445.8 ± 2.1	0.48%
63	1.36450 ± 0.00194	0.09803 ± 0.00041	0.00114 ± 0.00005	0.00033 ± 0.00010	0.000061 ± 0.000030	9.56E-15	98.7	13.73574	366.4 ± 2.9	0.80%

64	5.64932 ± 0.00173	0.42869 ± 0.00081	0.00517 ± 0.00006	0.00181 ± 0.00005	0.000123 ± 0.000032	3.96E-14	99.4	13.09357	350.8 ± 0.9	0.26%
65	4.06188 ± 0.00280	0.33098 ± 0.00109	0.00411 ± 0.00006	0.00069 ± 0.00008	-0.000012 ± 0.000030	2.84E-14	100.1	12.27247	330.7 ± 1.3	0.40%
66	4.71120 ± 0.00355	0.33567 ± 0.00102	0.00405 ± 0.00004	0.00194 ± 0.00007	0.000158 ± 0.000030	3.30E-14	99.0	13.89643	370.3 ± 1.4	0.37%
67	3.72775 ± 0.00273	0.31271 ± 0.00084	0.00373 ± 0.00006	0.00165 ± 0.00008	0.000175 ± 0.000044	2.61E-14	98.6	11.75561	318.0 ± 1.4	0.45%
68	1.19743 ± 0.00139	0.08374 ± 0.00017	0.00096 ± 0.00005	0.00090 ± 0.00005	0.000124 ± 0.000042	8.39E-15	96.9	13.86328	369.5 ± 4.1	1.11%
69	5.26845 ± 0.00415	0.37652 ± 0.00070	0.00443 ± 0.00009	0.00196 ± 0.00014	0.000222 ± 0.000044	3.69E-14	98.8	13.81873	368.4 ± 1.2	0.32%
70	2.48818 ± 0.00132	0.20575 ± 0.00046	0.00243 ± 0.00006	0.00094 ± 0.00008	0.000140 ± 0.000046	1.74E-14	98.3	11.89283	321.4 ± 1.9	0.60%
71	1.61775 ± 0.00132	0.12034 ± 0.00036	0.00139 ± 0.00006	0.00083 ± 0.00015	0.000161 ± 0.000045	1.13E-14	97.1	13.04725	349.7 ± 3.2	0.91%
72	1.46686 ± 0.00104	0.10458 ± 0.00040	0.00136 ± 0.00007	0.00015 ± 0.00012	-0.000047 ± 0.000027	1.03E-14	100.9	14.02680	373.4 ± 2.5	0.67%
73	3.92796 ± 0.00167	0.28184 ± 0.00046	0.00345 ± 0.00008	0.00194 ± 0.00011	0.000026 ± 0.000027	2.75E-14	99.8	13.90980	370.6 ± 1.0	0.27%
74	2.27055 ± 0.00271	0.16066 ± 0.00054	0.00194 ± 0.00007	0.00039 ± 0.00008	0.000072 ± 0.000032	1.59E-14	99.1	13.99957	372.8 ± 2.1	0.56%
75	2.04606 ± 0.00189	0.16911 ± 0.00065	0.00212 ± 0.00008	0.00053 ± 0.00013	0.000077 ± 0.000031	1.43E-14	98.9	11.96546	323.2 ± 2.0	0.61%
76	15.80358 ± 0.00750	1.12182 ± 0.00179	0.01374 ± 0.00011	0.00350 ± 0.00007	0.000427 ± 0.000067	1.11E-13	99.2	13.97523	372.2 ± 0.8	0.21%
77	1.79999 ± 0.00198	0.14915 ± 0.00054	0.00192 ± 0.00007	0.00056 ± 0.00006	-0.000034 ± 0.000032	1.26E-14	100.6	12.06892	325.7 ± 2.1	0.65%
78	1.79176 ± 0.00240	0.15064 ± 0.00046	0.00179 ± 0.00005	0.00049 ± 0.00014	-0.000027 ± 0.000033	1.25E-14	100.4	11.89488	321.4 ± 2.1	0.64%
79	6.22707 ± 0.00383	0.51285 ± 0.00111	0.00620 ± 0.00010	0.00083 ± 0.00024	0.000055 ± 0.000047	4.36E-14	99.7	12.11080	326.8 ± 1.0	0.32%
80	5.82795 ± 0.00388	0.41516 ± 0.00057	0.00496 ± 0.00007	0.00217 ± 0.00012	0.000023 ± 0.000029	4.08E-14	99.9	14.02230	373.3 ± 0.8	0.21%
81	4.26048 ± 0.00277	0.31230 ± 0.00056	0.00367 ± 0.00007	0.00170 ± 0.00013	0.000110 ± 0.000030	2.98E-14	99.2	13.53863	361.6 ± 1.0	0.28%
82	9.35675 ± 0.01031	0.67965 ± 0.00126	0.00828 ± 0.00007	0.00411 ± 0.00016	0.000128 ± 0.000026	6.55E-14	99.6	13.71205	365.8 ± 0.8	0.23%
83	6.13380 ± 0.00620	0.51507 ± 0.00069	0.00619 ± 0.00006	0.00122 ± 0.00006	0.000080 ± 0.000030	4.30E-14	99.6	11.86320	320.6 ± 0.7	0.22%
84	4.40425 ± 0.00211	0.30157 ± 0.00100	0.00374 ± 0.00006	0.00159 ± 0.00009	0.000126 ± 0.000028	3.08E-14	99.2	14.48144	384.3 ± 1.5	0.39%
85	2.09063 ± 0.00122	0.14914 ± 0.00048	0.00179 ± 0.00006	0.00111 ± 0.00013	0.000027 ± 0.000026	1.46E-14	99.6	13.96581	372.0 ± 1.8	0.49%
86	1.73887 ± 0.00074	0.14610 ± 0.00047	0.00177 ± 0.00006	0.00037 ± 0.00009	0.000033 ± 0.000029	1.22E-14	99.4	11.83447	319.9 ± 1.9	0.59%
87	4.63785 ± 0.00305	0.33226 ± 0.00087	0.00403 ± 0.00007	0.00095 ± 0.00010	0.000168 ± 0.000030	3.25E-14	98.9	13.80985	368.2 ± 1.2	0.33%
88	5.24109 ± 0.00306	0.29937 ± 0.00067	0.00359 ± 0.00004	0.00427 ± 0.00012	0.000153 ± 0.000030	3.67E-14	99.1	17.35749	451.8 ± 1.3	0.29%
89	3.49080 ± 0.00478	0.25372 ± 0.00070	0.00323 ± 0.00005	0.00193 ± 0.00009	0.000199 ± 0.000029	2.44E-14	98.3	13.52754	361.4 ± 1.4	0.40%
90	3.17332 ± 0.00222	0.25791 ± 0.00085	0.00319 ± 0.00007	0.00174 ± 0.00011	0.000124 ± 0.000027	2.22E-14	98.8	12.16206	328.0 ± 1.4	0.43%
91	5.11266 ± 0.00249	0.37865 ± 0.00084	0.00461 ± 0.00006	0.00050 ± 0.00014	0.000161 ± 0.000029	3.58E-14	99.1	13.37697	357.7 ± 1.0	0.28%
92	1.79622 ± 0.00209	0.14596 ± 0.00061	0.00185 ± 0.00006	0.00054 ± 0.00010	0.000131 ± 0.000034	1.26E-14	97.9	12.04146	325.0 ± 2.4	0.73%
93	4.87337 ± 0.00342	0.40214 ± 0.00095	0.00500 ± 0.00007	0.00277 ± 0.00012	0.000173 ± 0.000032	3.41E-14	99.0	11.99218	323.8 ± 1.0	0.32%
94	7.06888 ± 0.00691	0.51659 ± 0.00073	0.00617 ± 0.00008	0.00298 ± 0.00012	0.000031 ± 0.000042	4.95E-14	99.9	13.66690	364.7 ± 0.9	0.25%
95	4.49838 ± 0.00306	0.31789 ± 0.00049	0.00386 ± 0.00007	0.00055 ± 0.00010	0.000195 ± 0.000029	3.15E-14	98.7	13.96996	372.1 ± 1.0	0.26%
96	0.33501 ± 0.00052	0.02745 ± 0.00008	0.00030 ± 0.00004	0.00046 ± 0.00009	-0.000043 ± 0.000029	2.35E-15	103.8	12.20374	329.0 ± 8.4	2.56%
97	4.10070 ± 0.00279	0.29385 ± 0.00036	0.00357 ± 0.00005	0.00137 ± 0.00010	0.000150 ± 0.000045	2.87E-14	98.9	13.80474	368.1 ± 1.3	0.36%
98	3.13353 ± 0.00278	0.22263 ± 0.00072	0.00271 ± 0.00005	0.00056 ± 0.00009	0.000038 ± 0.000024	2.19E-14	99.6	14.02459	373.4 ± 1.5	0.40%
99	8.81448 ± 0.00686	0.72913 ± 0.00084	0.00921 ± 0.00008	0.00301 ± 0.00012	0.000389 ± 0.000025	6.17E-14	98.7	11.93182	322.3 ± 0.5	0.17%
100	10.52032 ± 0.01105	0.76854 ± 0.00121	0.00905 ± 0.00013	0.00596 ± 0.00015	0.000230 ± 0.000038	7.37E-14	99.4	13.60118	363.2 ± 0.8	0.22%
101	9.76400 ± 0.00770	0.78493 ± 0.00093	0.00944 ± 0.00009	0.00481 ± 0.00010	0.000106 ± 0.000032	6.84E-14	99.7	12.39997	333.9 ± 0.6	0.17%
102	7.63495 ± 0.00462	0.54601 ± 0.00126	0.00639 ± 0.00009	0.00066 ± 0.00008	0.000216 ± 0.000034	5.35E-14	99.2	13.86667	369.6 ± 1.0	0.27%

103	11.95762 ± 0.00511	0.85092 ± 0.00103	0.01034 ± 0.00014	0.00254 ± 0.00009	0.000409 ± 0.000054	8.37E-14	99.0	13.91076	370.6 ± 0.7	0.19%
104	5.26522 ± 0.00675	0.43605 ± 0.00066	0.00554 ± 0.00014	0.00089 ± 0.00014	0.000075 ± 0.000036	3.69E-14	99.6	12.02414	324.6 ± 0.9	0.28%
105	8.17599 ± 0.00407	0.67395 ± 0.00101	0.00832 ± 0.00010	0.00105 ± 0.00010	0.000244 ± 0.000035	5.73E-14	99.1	12.02473	324.6 ± 0.7	0.20%
106	4.38940 ± 0.00453	0.30247 ± 0.00098	0.00376 ± 0.00006	0.00110 ± 0.00007	0.000170 ± 0.000049	3.07E-14	98.9	14.34622	381.1 ± 1.8	0.48%
107	5.13943 ± 0.00801	0.38058 ± 0.00087	0.00460 ± 0.00006	0.00040 ± 0.00012	0.000025 ± 0.000025	3.60E-14	99.9	13.48511	360.4 ± 1.1	0.31%
108	4.63956 ± 0.00264	0.34088 ± 0.00097	0.00418 ± 0.00005	0.00060 ± 0.00012	0.000048 ± 0.000029	3.25E-14	99.7	13.56912	362.4 ± 1.3	0.35%
109	3.88147 ± 0.00352	0.27445 ± 0.00060	0.00337 ± 0.00005	0.00039 ± 0.00011	0.000118 ± 0.000026	2.72E-14	99.1	14.01647	373.2 ± 1.2	0.31%
110	2.13522 ± 0.00196	0.15598 ± 0.00047	0.00200 ± 0.00007	0.00049 ± 0.00010	0.000042 ± 0.000032	1.50E-14	99.4	13.61003	363.4 ± 2.0	0.54%
111	13.48067 ± 0.00851	0.94613 ± 0.00215	0.01168 ± 0.00016	0.00459 ± 0.00007	0.000159 ± 0.000040	9.44E-14	99.7	14.19906	377.6 ± 1.0	0.25%

au18.2a.mus (HDX 622) Mitchell Moore *j=0.016164±0.000040 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
1	0.75830 ± 0.00121	0.06334 ± 0.00015	0.00079 ± 0.00005	0.00011 ± 0.00010	-0.000051 ± 0.000041	5.31E-15	102.0	11.97136	319.1 ± 5.2	1.64%
2	2.78689 ± 0.00223	0.22941 ± 0.00047	0.00288 ± 0.00006	0.00015 ± 0.00014	0.000062 ± 0.000024	1.95E-14	99.3	12.06862	321.5 ± 1.1	0.34%
3	1.36560 ± 0.00262	0.11349 ± 0.00019	0.00144 ± 0.00003	0.00007 ± 0.00013	0.000010 ± 0.000024	9.56E-15	99.8	12.00606	320.0 ± 1.9	0.58%
4	0.81872 ± 0.00144	0.06708 ± 0.00025	0.00089 ± 0.00005	-0.00015 ± 0.00012	0.000048 ± 0.000027	5.73E-15	98.3	11.99485	319.7 ± 3.4	1.07%
5	0.31938 ± 0.00069	0.02619 ± 0.00018	0.00037 ± 0.00005	-0.00016 ± 0.00014	-0.000010 ± 0.000023	2.24E-15	100.9	12.19422	324.6 ± 7.2	2.22%
6	2.33322 ± 0.00234	0.19259 ± 0.00052	0.00240 ± 0.00005	0.00001 ± 0.00011	0.000059 ± 0.000027	1.63E-14	99.3	12.02468	320.4 ± 1.4	0.45%
7	1.21936 ± 0.00167	0.10269 ± 0.00036	0.00121 ± 0.00006	0.00019 ± 0.00013	-0.000045 ± 0.000026	8.54E-15	101.1	11.87439	316.8 ± 2.3	0.74%
8	0.82261 ± 0.00100	0.05829 ± 0.00030	0.00071 ± 0.00005	-0.00009 ± 0.00011	-0.000046 ± 0.000027	5.76E-15	101.7	14.11105	370.7 ± 4.1	1.11%
9	0.57537 ± 0.00108	0.04670 ± 0.00025	0.00056 ± 0.00004	-0.00017 ± 0.00017	-0.000029 ± 0.000024	4.03E-15	101.5	12.31973	327.6 ± 4.4	1.34%
10	0.78909 ± 0.00101	0.06547 ± 0.00040	0.00081 ± 0.00005	-0.00010 ± 0.00011	-0.000044 ± 0.000025	5.53E-15	101.6	12.05162	321.1 ± 3.7	1.14%
11	1.07176 ± 0.00174	0.08758 ± 0.00039	0.00107 ± 0.00004	-0.00013 ± 0.00018	-0.000071 ± 0.000035	7.51E-15	101.9	12.23710	325.6 ± 3.5	1.08%
12	1.96470 ± 0.00233	0.16106 ± 0.00033	0.00192 ± 0.00008	0.00019 ± 0.00015	-0.000042 ± 0.000025	1.38E-14	100.6	12.19854	324.7 ± 1.5	0.45%
13	0.69657 ± 0.00167	0.05624 ± 0.00015	0.00069 ± 0.00004	-0.00041 ± 0.00012	0.000024 ± 0.000019	4.88E-15	99.0	12.26189	326.2 ± 2.9	0.90%
14	1.09709 ± 0.00120	0.09017 ± 0.00042	0.00112 ± 0.00005	0.00008 ± 0.00013	0.000106 ± 0.000037	7.68E-15	97.1	11.81904	315.4 ± 3.6	1.14%
15	1.16489 ± 0.00150	0.07790 ± 0.00037	0.00100 ± 0.00006	0.00016 ± 0.00020	-0.000027 ± 0.000025	8.16E-15	100.7	14.95456	390.6 ± 3.2	0.81%
16	1.07467 ± 0.00084	0.08788 ± 0.00018	0.00103 ± 0.00006	0.00009 ± 0.00014	0.000038 ± 0.000024	7.53E-15	99.0	12.10259	322.3 ± 2.3	0.70%
17	0.79736 ± 0.00088	0.06612 ± 0.00034	0.00080 ± 0.00005	0.00010 ± 0.00013	0.000042 ± 0.000022	5.58E-15	98.5	11.87259	316.7 ± 3.1	0.97%
18	0.28912 ± 0.00057	0.02351 ± 0.00014	0.00034 ± 0.00006	0.00005 ± 0.00008	0.000099 ± 0.000023	2.02E-15	89.9	11.05734	296.7 ± 7.9	2.67%
19	1.25244 ± 0.00113	0.10181 ± 0.00030	0.00119 ± 0.00006	0.00010 ± 0.00016	0.000120 ± 0.000025	8.77E-15	97.2	11.95400	318.7 ± 2.2	0.68%
20	0.61310 ± 0.00096	0.04823 ± 0.00027	0.00061 ± 0.00005	0.00022 ± 0.00015	0.000137 ± 0.000024	4.29E-15	93.4	11.87147	316.7 ± 4.4	1.38%
21	1.21442 ± 0.00085	0.09836 ± 0.00040	0.00127 ± 0.00007	0.00034 ± 0.00010	0.000113 ± 0.000027	8.50E-15	97.3	12.00849	320.0 ± 2.6	0.81%
22	2.37560 ± 0.00232	0.19557 ± 0.00058	0.00275 ± 0.00013	0.00012 ± 0.00017	0.000068 ± 0.000027	1.66E-14	99.2	12.04394	320.9 ± 1.5	0.46%
23	0.91916 ± 0.00113	0.07538 ± 0.00027	0.00091 ± 0.00005	0.00010 ± 0.00019	0.000078 ± 0.000025	6.44E-15	97.5	11.88802	317.1 ± 2.9	0.90%
24	1.87017 ± 0.00143	0.12202 ± 0.00021	0.00151 ± 0.00005	-0.00012 ± 0.00008	0.000030 ± 0.000028	1.31E-14	99.5	15.25438	397.6 ± 1.9	0.49%
25	1.11572 ± 0.00085	0.07883 ± 0.00051	0.00092 ± 0.00006	0.00012 ± 0.00015	0.000054 ± 0.000028	7.81E-15	98.6	13.95345	366.9 ± 3.7	1.00%
26	1.11687 ± 0.00166	0.09258 ± 0.00024	0.00110 ± 0.00003	-0.00049 ± 0.00017	-0.000022 ± 0.000047	7.82E-15	100.6	12.06273	321.4 ± 4.1	1.29%

27	1.11272 ± 0.00237	0.09180 ± 0.00053	0.00113 ± 0.00006	-0.00006 ± 0.00018	0.000021 ± 0.000027	7.79E-15	99.4	12.05307	321.1 ± 3.1	0.96%
28	1.90431 ± 0.00302	0.12841 ± 0.00038	0.00161 ± 0.00005	0.00036 ± 0.00016	0.000042 ± 0.000028	1.33E-14	99.4	14.73374	385.4 ± 2.1	0.55%
29	0.68742 ± 0.00101	0.05659 ± 0.00030	0.00063 ± 0.00005	-0.00015 ± 0.00008	0.000012 ± 0.000027	4.81E-15	99.5	12.08702	322.0 ± 4.1	1.28%
30	0.49833 ± 0.00094	0.04008 ± 0.00021	0.00049 ± 0.00005	-0.00002 ± 0.00013	0.000041 ± 0.000026	3.49E-15	97.6	12.13273	323.1 ± 5.4	1.68%
31	0.94069 ± 0.00186	0.07844 ± 0.00023	0.00097 ± 0.00005	-0.00029 ± 0.00019	0.000015 ± 0.000028	6.59E-15	99.5	11.93531	318.3 ± 3.0	0.95%
32	1.84133 ± 0.00175	0.15281 ± 0.00032	0.00188 ± 0.00005	0.00008 ± 0.00013	0.000067 ± 0.000025	1.29E-14	98.9	11.91933	317.9 ± 1.5	0.48%
33	0.42962 ± 0.00102	0.03397 ± 0.00013	0.00047 ± 0.00005	0.00004 ± 0.00016	0.000077 ± 0.000030	3.01E-15	94.7	11.97624	319.3 ± 7.0	2.21%
34	0.75768 ± 0.00104	0.06112 ± 0.00027	0.00084 ± 0.00005	0.00007 ± 0.00013	0.000065 ± 0.000030	5.31E-15	97.5	12.08329	321.9 ± 4.2	1.29%
35	1.05679 ± 0.00117	0.08555 ± 0.00042	0.00111 ± 0.00004	-0.00010 ± 0.00012	0.000036 ± 0.000026	7.40E-15	99.0	12.22720	325.4 ± 2.9	0.89%
36	1.19590 ± 0.00179	0.09852 ± 0.00033	0.00124 ± 0.00006	0.00018 ± 0.00016	0.000026 ± 0.000028	8.38E-15	99.4	12.06062	321.3 ± 2.5	0.79%
37	0.88857 ± 0.00108	0.07416 ± 0.00036	0.00090 ± 0.00008	0.00025 ± 0.00010	0.000009 ± 0.000021	6.22E-15	99.7	11.94751	318.5 ± 2.8	0.87%
38	2.78419 ± 0.00285	0.23268 ± 0.00054	0.00283 ± 0.00007	0.00018 ± 0.00014	0.000016 ± 0.000024	1.95E-14	99.8	11.94576	318.5 ± 1.1	0.36%
39	1.43247 ± 0.00145	0.11605 ± 0.00059	0.00150 ± 0.00006	0.00003 ± 0.00017	0.000052 ± 0.000042	1.00E-14	98.9	12.21048	325.0 ± 3.3	1.02%
40	0.79174 ± 0.00090	0.06536 ± 0.00033	0.00086 ± 0.00006	0.00003 ± 0.00023	-0.000007 ± 0.000026	5.54E-15	100.3	12.11286	322.6 ± 3.5	1.09%
41	0.68572 ± 0.00097	0.04794 ± 0.00032	0.00068 ± 0.00005	-0.00013 ± 0.00009	0.000094 ± 0.000041	4.80E-15	96.0	13.72566	361.5 ± 7.1	1.97%
42	0.68113 ± 0.00128	0.05705 ± 0.00038	0.00064 ± 0.00006	-0.00032 ± 0.00016	0.000044 ± 0.000041	4.77E-15	98.1	11.71071	312.8 ± 6.1	1.94%
43	1.17083 ± 0.00181	0.09661 ± 0.00036	0.00119 ± 0.00005	-0.00016 ± 0.00015	0.000102 ± 0.000041	8.20E-15	97.4	11.80607	315.1 ± 3.6	1.13%
44	1.16798 ± 0.00148	0.08207 ± 0.00057	0.00104 ± 0.00005	-0.00040 ± 0.00015	0.000148 ± 0.000041	8.18E-15	96.3	13.69989	360.9 ± 4.7	1.31%
45	1.20059 ± 0.00179	0.10027 ± 0.00031	0.00124 ± 0.00005	-0.00013 ± 0.00015	0.000194 ± 0.000047	8.41E-15	95.2	11.40282	305.2 ± 3.9	1.28%
46	1.58918 ± 0.00161	0.13117 ± 0.00032	0.00159 ± 0.00008	0.00043 ± 0.00019	0.000009 ± 0.000046	1.11E-14	99.8	12.09650	322.2 ± 2.9	0.90%
47	1.08657 ± 0.00196	0.09043 ± 0.00042	0.00112 ± 0.00005	-0.00038 ± 0.00007	0.000067 ± 0.000058	7.61E-15	98.2	11.79705	314.9 ± 5.3	1.69%
48	1.68700 ± 0.00177	0.09803 ± 0.00029	0.00110 ± 0.00006	0.00021 ± 0.00016	0.000035 ± 0.000026	1.18E-14	99.4	17.10203	440.3 ± 2.5	0.56%
49	0.92604 ± 0.00094	0.06542 ± 0.00044	0.00094 ± 0.00007	0.00008 ± 0.00012	-0.000001 ± 0.000029	6.49E-15	100.0	14.15485	371.7 ± 4.3	1.15%
50	0.64336 ± 0.00116	0.05330 ± 0.00025	0.00068 ± 0.00005	0.00023 ± 0.00016	0.000154 ± 0.000044	4.51E-15	92.9	11.21581	300.6 ± 6.8	2.26%
51	0.76446 ± 0.00124	0.06228 ± 0.00022	0.00070 ± 0.00004	0.00048 ± 0.00016	0.000121 ± 0.000043	5.35E-15	95.3	11.70265	312.6 ± 5.6	1.79%
52	0.44320 ± 0.00066	0.03669 ± 0.00025	0.00044 ± 0.00006	-0.00023 ± 0.00016	0.000082 ± 0.000044	3.10E-15	94.5	11.41850	305.6 ± 9.8	3.22%
53	0.28120 ± 0.00100	0.02278 ± 0.00013	0.00028 ± 0.00006	0.00034 ± 0.00013	0.000078 ± 0.000043	1.97E-15	91.8	11.33794	303.6 ± 15.1	4.98%
54	0.47219 ± 0.00099	0.03794 ± 0.00035	0.00044 ± 0.00004	0.00000 ± 0.00006	0.000122 ± 0.000044	3.31E-15	92.4	11.49967	307.6 ± 9.6	3.13%
55	0.42416 ± 0.00124	0.03520 ± 0.00021	0.00040 ± 0.00005	-0.00006 ± 0.00009	0.000082 ± 0.000042	2.97E-15	94.3	11.35887	304.1 ± 9.6	3.16%
56	0.39118 ± 0.00079	0.03179 ± 0.00017	0.00036 ± 0.00004	-0.00018 ± 0.00014	-0.000012 ± 0.000060	2.74E-15	100.9	12.30488	327.3 ± 14.8	4.53%
57	0.84362 ± 0.00092	0.06998 ± 0.00026	0.00083 ± 0.00005	-0.00002 ± 0.00013	0.000143 ± 0.000040	5.91E-15	95.0	11.44883	306.3 ± 4.7	1.54%
58	1.37150 ± 0.00096	0.11232 ± 0.00036	0.00130 ± 0.00004	0.00019 ± 0.00013	0.000114 ± 0.000041	9.61E-15	97.5	11.91081	317.7 ± 3.1	0.97%
59	0.89339 ± 0.00118	0.07297 ± 0.00031	0.00081 ± 0.00005	-0.00018 ± 0.00008	-0.000046 ± 0.000037	6.26E-15	101.5	12.24343	325.8 ± 4.2	1.30%
60	0.80579 ± 0.00119	0.06630 ± 0.00027	0.00075 ± 0.00006	0.00004 ± 0.00015	-0.000010 ± 0.000035	5.64E-15	100.4	12.15433	323.6 ± 4.3	1.34%
61	1.04543 ± 0.00090	0.08694 ± 0.00041	0.00106 ± 0.00006	0.00007 ± 0.00014	-0.000055 ± 0.000034	7.32E-15	101.5	12.02428	320.4 ± 3.4	1.07%
62	1.26673 ± 0.00108	0.09972 ± 0.00041	0.00112 ± 0.00005	-0.00047 ± 0.00014	0.000162 ± 0.000034	8.87E-15	96.2	12.22107	325.2 ± 3.0	0.94%
63	1.02863 ± 0.00156	0.08512 ± 0.00026	0.00095 ± 0.00005	-0.00003 ± 0.00014	0.000065 ± 0.000050	7.20E-15	98.1	11.85986	316.4 ± 4.8	1.51%
64	1.06737 ± 0.00149	0.06668 ± 0.00035	0.00078 ± 0.00007	-0.00063 ± 0.00023	0.000050 ± 0.000030	7.48E-15	98.6	15.78332	409.9 ± 4.1	1.00%
65	1.64921 ± 0.00179	0.11578 ± 0.00039	0.00143 ± 0.00004	-0.00024 ± 0.00011	0.000025 ± 0.000029	1.15E-14	99.6	14.18114	372.3 ± 2.4	0.63%

66	0.68864 ± 0.00078	0.05693 ± 0.00022	0.00070 ± 0.00005	0.00006 ± 0.00011	0.000041 ± 0.000028	4.82E-15	98.2	11.88174	316.9 ± 4.0	1.27%
67	0.76256 ± 0.00154	0.06283 ± 0.00030	0.00075 ± 0.00005	0.00007 ± 0.00011	-0.000031 ± 0.000045	5.34E-15	101.2	12.13730	323.2 ± 5.9	1.83%
68	1.38208 ± 0.00236	0.10199 ± 0.00036	0.00124 ± 0.00004	0.00043 ± 0.00018	-0.000037 ± 0.000038	9.68E-15	100.8	13.55099	357.3 ± 3.2	0.90%
69	1.72398 ± 0.00254	0.13128 ± 0.00084	0.00162 ± 0.00005	0.00013 ± 0.00014	0.000070 ± 0.000022	1.21E-14	98.8	12.97611	343.5 ± 2.6	0.77%
70	1.50309 ± 0.00113	0.11742 ± 0.00037	0.00140 ± 0.00004	0.00017 ± 0.00009	0.000062 ± 0.000022	1.05E-14	98.8	12.64478	335.5 ± 1.9	0.55%
71	0.67503 ± 0.00116	0.05220 ± 0.00023	0.00063 ± 0.00005	0.00013 ± 0.00012	0.000074 ± 0.000023	4.73E-15	96.8	12.51306	332.3 ± 3.8	1.16%
72	0.82755 ± 0.00138	0.05883 ± 0.00027	0.00077 ± 0.00005	0.00012 ± 0.00010	0.000056 ± 0.000024	5.80E-15	98.0	13.78505	362.9 ± 3.6	1.00%
73	0.56511 ± 0.00112	0.04262 ± 0.00029	0.00055 ± 0.00005	0.00025 ± 0.00014	0.000014 ± 0.000022	3.96E-15	99.3	13.16483	348.1 ± 4.7	1.36%
74	0.41712 ± 0.00080	0.03428 ± 0.00017	0.00038 ± 0.00005	0.00028 ± 0.00007	-0.000012 ± 0.000046	2.92E-15	100.8	12.16762	323.9 ± 10.7	3.29%
75	0.74843 ± 0.00118	0.06140 ± 0.00034	0.00066 ± 0.00007	0.00013 ± 0.00020	0.000068 ± 0.000041	5.24E-15	97.3	11.86411	316.5 ± 5.5	1.75%
76	1.11283 ± 0.00155	0.09288 ± 0.00046	0.00105 ± 0.00006	0.00038 ± 0.00013	0.000106 ± 0.000041	7.79E-15	97.2	11.64349	311.1 ± 3.9	1.25%
77	0.70246 ± 0.00116	0.05853 ± 0.00029	0.00065 ± 0.00006	0.00031 ± 0.00009	-0.000006 ± 0.000046	4.92E-15	100.3	12.00262	319.9 ± 6.3	1.98%
78	1.09019 ± 0.00147	0.08835 ± 0.00031	0.00098 ± 0.00005	0.00037 ± 0.00014	0.000077 ± 0.000040	7.63E-15	97.9	12.08300	321.9 ± 3.8	1.17%
79	0.42228 ± 0.00105	0.02792 ± 0.00024	0.00035 ± 0.00004	-0.00031 ± 0.00013	-0.000044 ± 0.000022	2.96E-15	103.1	15.12398	394.6 ± 7.0	1.78%
80	1.38369 ± 0.00159	0.09779 ± 0.00069	0.00108 ± 0.00007	-0.00009 ± 0.00014	0.000034 ± 0.000023	9.69E-15	99.3	14.04671	369.1 ± 3.2	0.87%
81	0.77444 ± 0.00082	0.06448 ± 0.00039	0.00075 ± 0.00006	-0.00020 ± 0.00008	-0.000044 ± 0.000044	5.42E-15	101.7	12.01019	320.1 ± 5.7	1.77%
82	0.90374 ± 0.00154	0.07364 ± 0.00037	0.00083 ± 0.00004	-0.00011 ± 0.00020	0.000053 ± 0.000023	6.33E-15	98.3	12.05802	321.2 ± 3.0	0.93%
83	1.19528 ± 0.00211	0.09950 ± 0.00031	0.00122 ± 0.00005	0.00022 ± 0.00008	0.000098 ± 0.000036	8.37E-15	97.6	11.72160	313.0 ± 3.1	0.98%
84	1.47404 ± 0.00170	0.10209 ± 0.00023	0.00133 ± 0.00007	0.00007 ± 0.00013	-0.000001 ± 0.000029	1.03E-14	100.0	14.43879	378.4 ± 2.4	0.63%
85	0.81778 ± 0.00065	0.06766 ± 0.00041	0.00085 ± 0.00005	0.00026 ± 0.00016	0.000135 ± 0.000051	5.73E-15	95.1	11.49773	307.5 ± 6.3	2.04%
86	1.47677 ± 0.00168	0.10367 ± 0.00044	0.00132 ± 0.00006	0.00078 ± 0.00016	0.000063 ± 0.000029	1.03E-14	98.7	14.06528	369.6 ± 2.7	0.74%
87	0.45723 ± 0.00081	0.03255 ± 0.00019	0.00037 ± 0.00006	-0.00027 ± 0.00015	0.000008 ± 0.000032	3.20E-15	99.5	13.97405	367.4 ± 8.0	2.16%
88	0.62381 ± 0.00133	0.05156 ± 0.00027	0.00062 ± 0.00004	0.00014 ± 0.00008	0.000009 ± 0.000027	4.37E-15	99.6	12.04564	320.9 ± 4.5	1.40%
89	1.92519 ± 0.00187	0.11465 ± 0.00045	0.00136 ± 0.00006	0.00039 ± 0.00013	0.000025 ± 0.000025	1.35E-14	99.6	16.72769	431.8 ± 2.4	0.56%
90	0.71771 ± 0.00118	0.05913 ± 0.00015	0.00071 ± 0.00007	-0.00020 ± 0.00014	-0.000014 ± 0.000025	5.03E-15	100.6	12.13656	323.2 ± 3.4	1.06%
91	1.05801 ± 0.00117	0.07084 ± 0.00019	0.00091 ± 0.00005	0.00013 ± 0.00011	-0.000032 ± 0.000028	7.41E-15	100.9	14.93608	390.2 ± 3.2	0.83%
92	0.97315 ± 0.00132	0.08023 ± 0.00040	0.00093 ± 0.00005	0.00030 ± 0.00017	-0.000034 ± 0.000027	6.82E-15	101.0	12.12967	323.0 ± 3.1	0.97%
93	1.20362 ± 0.00111	0.09865 ± 0.00040	0.00121 ± 0.00005	0.00016 ± 0.00017	0.000087 ± 0.000023	8.43E-15	97.9	11.94013	318.4 ± 2.3	0.71%
94	1.33748 ± 0.00146	0.10791 ± 0.00031	0.00129 ± 0.00006	-0.00032 ± 0.00008	0.000127 ± 0.000025	9.37E-15	97.2	12.04777	321.0 ± 2.1	0.65%
95	1.30405 ± 0.00131	0.10792 ± 0.00036	0.00132 ± 0.00005	-0.00005 ± 0.00018	0.000051 ± 0.000022	9.13E-15	98.8	11.94330	318.4 ± 1.9	0.61%
96	1.05773 ± 0.00145	0.08790 ± 0.00029	0.00103 ± 0.00005	-0.00023 ± 0.00013	-0.000011 ± 0.000023	7.41E-15	100.3	12.03263	320.6 ± 2.4	0.75%
97	0.62018 ± 0.00070	0.05160 ± 0.00031	0.00069 ± 0.00005	0.00003 ± 0.00012	0.000023 ± 0.000025	4.34E-15	98.9	11.88652	317.1 ± 4.3	1.36%
98	0.38189 ± 0.00111	0.03166 ± 0.00020	0.00038 ± 0.00004	0.00017 ± 0.00017	0.000018 ± 0.000025	2.67E-15	98.6	11.89949	317.4 ± 6.6	2.08%
99	0.82063 ± 0.00116	0.06856 ± 0.00036	0.00086 ± 0.00005	0.00017 ± 0.00009	0.000018 ± 0.000025	5.75E-15	99.4	11.89385	317.2 ± 3.3	1.05%
100	0.56129 ± 0.00075	0.04080 ± 0.00028	0.00051 ± 0.00006	0.00018 ± 0.00008	0.000053 ± 0.000026	3.93E-15	97.2	13.37698	353.2 ± 5.5	1.57%
101	1.71706 ± 0.00279	0.14126 ± 0.00041	0.00174 ± 0.00006	0.00019 ± 0.00015	0.000044 ± 0.000024	1.20E-14	99.3	12.06472	321.4 ± 1.7	0.54%
102	0.86265 ± 0.00178	0.06232 ± 0.00038	0.00103 ± 0.00009	0.00037 ± 0.00015	0.000056 ± 0.000023	6.04E-15	98.1	13.57565	357.9 ± 3.8	1.05%

au18.4f.mus (HDX 1094) Mitchell Moore *j=0.016446±0.0000453 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
1	4.87698 ± 0.00546	0.35022 ± 0.00086	0.00426 ± 0.00005	0.00146 ± 0.00008	0.000175 ± 0.000024	3.42E-14	98.9	13.77815	368.5 ± 1.1	0.31%
2	1.36544 ± 0.00157	0.09147 ± 0.00024	0.00110 ± 0.00006	-0.00001 ± 0.00009	0.000138 ± 0.000024	9.56E-15	97.0	14.48216	385.4 ± 2.4	0.62%
3	5.49303 ± 0.00376	0.38460 ± 0.00052	0.00487 ± 0.00007	0.00040 ± 0.00012	0.000483 ± 0.000024	3.85E-14	97.4	13.91144	371.7 ± 0.8	0.20%
4	5.62985 ± 0.00460	0.47081 ± 0.00087	0.00573 ± 0.00005	0.00094 ± 0.00011	0.000228 ± 0.000026	3.94E-14	98.8	11.81449	320.3 ± 0.8	0.25%
5	10.65724 ± 0.01497	0.86988 ± 0.00075	0.01073 ± 0.00006	0.00109 ± 0.00011	0.000506 ± 0.000043	7.46E-14	98.6	12.07958	326.9 ± 0.7	0.21%
6	3.61172 ± 0.00349	0.25809 ± 0.00070	0.00309 ± 0.00005	0.00026 ± 0.00011	0.000070 ± 0.000027	2.53E-14	99.4	13.91415	371.8 ± 1.4	0.36%
7	5.93107 ± 0.00405	0.49382 ± 0.00140	0.00604 ± 0.00007	0.00059 ± 0.00012	0.000007 ± 0.000053	4.15E-14	100.0	12.00657	325.1 ± 1.3	0.39%
8	5.72935 ± 0.00501	0.48203 ± 0.00066	0.00581 ± 0.00005	-0.00059 ± 0.00013	-0.000059 ± 0.000044	4.01E-14	100.3	11.88582	322.1 ± 0.9	0.28%
9	8.57701 ± 0.00494	0.60639 ± 0.00062	0.00760 ± 0.00010	0.00054 ± 0.00012	0.000178 ± 0.000027	6.01E-14	99.4	14.05757	375.2 ± 0.6	0.15%
10	1.12435 ± 0.00113	0.07740 ± 0.00037	0.00097 ± 0.00005	0.00008 ± 0.00014	0.000527 ± 0.000040	7.87E-15	86.2	12.51454	337.6 ± 4.6	1.35%
11	7.25547 ± 0.00769	0.61033 ± 0.00135	0.00771 ± 0.00012	0.00025 ± 0.00012	0.000027 ± 0.000024	5.08E-14	99.9	11.87455	321.8 ± 0.9	0.26%
12	2.51799 ± 0.00212	0.20500 ± 0.00037	0.00246 ± 0.00006	0.00001 ± 0.00011	0.000140 ± 0.000024	1.76E-14	98.4	12.08062	326.9 ± 1.2	0.35%
13	5.88719 ± 0.00493	0.47324 ± 0.00095	0.00588 ± 0.00007	0.00031 ± 0.00013	0.000319 ± 0.000025	4.12E-14	98.4	12.24094	330.9 ± 0.8	0.25%
14	4.56858 ± 0.00350	0.38008 ± 0.00082	0.00450 ± 0.00005	0.00116 ± 0.00009	0.000148 ± 0.000024	3.20E-14	99.0	11.90517	322.6 ± 0.9	0.28%
15	4.08751 ± 0.00296	0.33379 ± 0.00055	0.00406 ± 0.00007	0.00002 ± 0.00017	0.000157 ± 0.000021	2.86E-14	98.9	12.10700	327.6 ± 0.8	0.24%
16	2.14322 ± 0.00134	0.18073 ± 0.00027	0.00220 ± 0.00005	0.00082 ± 0.00012	0.000119 ± 0.000023	1.50E-14	98.4	11.66533	316.6 ± 1.2	0.37%
17	2.88904 ± 0.00295	0.24166 ± 0.00046	0.00301 ± 0.00007	0.00198 ± 0.00014	0.000150 ± 0.000020	2.02E-14	98.5	11.77165	319.3 ± 1.0	0.30%
18	1.42510 ± 0.00097	0.11988 ± 0.00019	0.00144 ± 0.00006	0.00076 ± 0.00016	0.000105 ± 0.000024	9.98E-15	97.8	11.62962	315.7 ± 1.7	0.53%
19	2.36345 ± 0.00311	0.14960 ± 0.00061	0.00187 ± 0.00006	0.00031 ± 0.00006	-0.000035 ± 0.000039	1.66E-14	100.4	15.79897	416.7 ± 2.7	0.65%
20	1.74680 ± 0.00195	0.14583 ± 0.00031	0.00176 ± 0.00005	0.00012 ± 0.00011	0.000098 ± 0.000022	1.22E-14	98.3	11.77898	319.5 ± 1.4	0.45%
21	2.48703 ± 0.00263	0.18966 ± 0.00080	0.00227 ± 0.00004	0.00022 ± 0.00009	0.000052 ± 0.000027	1.74E-14	99.4	13.03248	350.3 ± 1.9	0.55%
22	4.97895 ± 0.00292	0.30041 ± 0.00044	0.00368 ± 0.00005	-0.00001 ± 0.00008	0.000116 ± 0.000027	3.49E-14	99.3	16.45999	432.2 ± 1.0	0.22%
23	2.28048 ± 0.00288	0.14342 ± 0.00076	0.00174 ± 0.00005	0.00078 ± 0.00013	0.000032 ± 0.000032	1.60E-14	99.6	15.83439	417.5 ± 2.9	0.69%
24	2.68607 ± 0.00260	0.22226 ± 0.00066	0.00279 ± 0.00007	0.00010 ± 0.00013	0.000137 ± 0.000030	1.88E-14	98.5	11.90346	322.5 ± 1.5	0.46%
25	1.90387 ± 0.00105	0.11358 ± 0.00039	0.00142 ± 0.00004	0.00023 ± 0.00009	0.000112 ± 0.000022	1.33E-14	98.3	16.47236	432.5 ± 2.2	0.50%
26	4.91241 ± 0.00296	0.37583 ± 0.00071	0.00457 ± 0.00006	0.00081 ± 0.00012	0.000035 ± 0.000026	3.44E-14	99.8	13.04337	350.6 ± 0.9	0.25%
27	4.13400 ± 0.00347	0.34834 ± 0.00085	0.00424 ± 0.00006	0.00004 ± 0.00010	0.000059 ± 0.000024	2.90E-14	99.6	11.81813	320.4 ± 1.0	0.31%
28	2.46956 ± 0.00212	0.20564 ± 0.00066	0.00246 ± 0.00004	0.00046 ± 0.00013	0.000196 ± 0.000029	1.73E-14	97.7	11.72827	318.2 ± 1.6	0.49%
29	3.00750 ± 0.00160	0.22359 ± 0.00061	0.00267 ± 0.00006	0.00025 ± 0.00012	0.000088 ± 0.000026	2.11E-14	99.1	13.33468	357.7 ± 1.4	0.38%
30	2.38328 ± 0.00211	0.20031 ± 0.00052	0.00247 ± 0.00005	0.00042 ± 0.00010	0.000059 ± 0.000028	1.67E-14	99.3	11.81022	320.2 ± 1.4	0.44%
31	4.72682 ± 0.00409	0.39675 ± 0.00081	0.00476 ± 0.00007	0.00048 ± 0.00014	0.000140 ± 0.000023	3.31E-14	99.1	11.80936	320.2 ± 0.9	0.27%
32	1.60639 ± 0.00188	0.13539 ± 0.00025	0.00159 ± 0.00006	-0.00001 ± 0.00006	0.000031 ± 0.000023	1.13E-14	99.4	11.79640	319.9 ± 1.5	0.48%
33	5.00344 ± 0.00381	0.35481 ± 0.00055	0.00433 ± 0.00007	0.00298 ± 0.00014	0.000202 ± 0.000023	3.50E-14	98.8	13.93420	372.2 ± 0.8	0.22%
34	3.28726 ± 0.00243	0.23446 ± 0.00058	0.00280 ± 0.00008	0.00050 ± 0.00011	0.000166 ± 0.000025	2.30E-14	98.5	13.81214	369.3 ± 1.3	0.35%
35	2.92064 ± 0.00265	0.24636 ± 0.00063	0.00299 ± 0.00006	0.00009 ± 0.00012	0.000048 ± 0.000022	2.05E-14	99.5	11.79779	319.9 ± 1.1	0.36%
36	2.96902 ± 0.00233	0.24912 ± 0.00040	0.00292 ± 0.00005	0.00040 ± 0.00010	0.000063 ± 0.000021	2.08E-14	99.4	11.84308	321.0 ± 0.9	0.28%

37	3.25393 ± 0.00160	0.27361 ± 0.00038	0.00335 ± 0.00007	0.00025 ± 0.00006	0.000057 ± 0.000020	2.28E-14	99.5	11.83126	320.8 ± 0.8	0.24%
38	4.25170 ± 0.00378	0.35533 ± 0.00072	0.00429 ± 0.00006	-0.00013 ± 0.00009	0.000249 ± 0.000023	2.98E-14	98.3	11.75878	318.9 ± 0.9	0.28%
39	2.53270 ± 0.00172	0.18493 ± 0.00066	0.00219 ± 0.00005	0.00021 ± 0.00012	0.000017 ± 0.000027	1.77E-14	99.8	13.66790	365.8 ± 1.8	0.49%
40	4.21116 ± 0.00173	0.35612 ± 0.00063	0.00430 ± 0.00005	0.00017 ± 0.00010	0.000061 ± 0.000026	2.95E-14	99.6	11.77415	319.3 ± 0.8	0.26%
41	1.60418 ± 0.00182	0.13405 ± 0.00049	0.00155 ± 0.00005	0.00001 ± 0.00012	0.000056 ± 0.000030	1.12E-14	99.0	11.84276	321.0 ± 2.2	0.68%
42	2.71862 ± 0.00320	0.22593 ± 0.00061	0.00272 ± 0.00007	0.00003 ± 0.00011	0.000182 ± 0.000031	1.90E-14	98.0	11.79541	319.9 ± 1.5	0.45%
43	1.88305 ± 0.00170	0.15862 ± 0.00048	0.00226 ± 0.00011	0.00035 ± 0.00008	0.000033 ± 0.000038	1.32E-14	99.5	11.80925	320.2 ± 2.2	0.68%
44	0.71231 ± 0.00263	0.05416 ± 0.00031	0.00069 ± 0.00004	0.00046 ± 0.00010	0.000084 ± 0.000027	4.99E-15	96.5	12.69332	342.0 ± 4.7	1.36%
45	1.14096 ± 0.00129	0.09604 ± 0.00037	0.00117 ± 0.00006	0.00061 ± 0.00007	0.000098 ± 0.000025	7.99E-15	97.5	11.58046	314.5 ± 2.5	0.78%
46	4.50101 ± 0.00417	0.32273 ± 0.00086	0.00393 ± 0.00008	-0.00001 ± 0.00015	0.000030 ± 0.000028	3.15E-14	99.8	13.91892	371.9 ± 1.3	0.34%
47	3.70865 ± 0.00237	0.25629 ± 0.00052	0.00317 ± 0.00006	-0.00002 ± 0.00008	0.000014 ± 0.000026	2.60E-14	99.9	14.45419	384.7 ± 1.1	0.30%
48	2.92590 ± 0.00181	0.24539 ± 0.00047	0.00295 ± 0.00006	0.00060 ± 0.00013	0.000091 ± 0.000027	2.05E-14	99.1	11.81413	320.3 ± 1.1	0.34%
49	2.69364 ± 0.00167	0.22766 ± 0.00032	0.00279 ± 0.00005	0.00022 ± 0.00009	-0.000121 ± 0.000042	1.89E-14	101.3	11.83174	320.8 ± 1.6	0.48%
50	2.69839 ± 0.00168	0.22208 ± 0.00042	0.00280 ± 0.00005	0.00026 ± 0.00008	0.000281 ± 0.000025	1.89E-14	96.9	11.77682	319.4 ± 1.1	0.35%
51	2.13115 ± 0.00254	0.17533 ± 0.00048	0.00215 ± 0.00008	0.00019 ± 0.00010	0.000104 ± 0.000028	1.49E-14	98.6	11.97913	324.4 ± 1.6	0.49%
52	2.02398 ± 0.00207	0.16926 ± 0.00056	0.00205 ± 0.00006	0.00005 ± 0.00010	0.000143 ± 0.000036	1.42E-14	97.9	11.70882	317.7 ± 2.0	0.64%
53	5.22374 ± 0.00380	0.41709 ± 0.00062	0.00514 ± 0.00007	0.00035 ± 0.00012	0.000196 ± 0.000025	3.66E-14	98.9	12.38507	334.5 ± 0.7	0.22%
54	1.91241 ± 0.00183	0.14057 ± 0.00048	0.00179 ± 0.00005	0.00048 ± 0.00013	0.000045 ± 0.000024	1.34E-14	99.3	13.51001	362.0 ± 1.9	0.52%
55	2.46075 ± 0.00222	0.20606 ± 0.00032	0.00253 ± 0.00004	0.00054 ± 0.00015	0.000129 ± 0.000030	1.72E-14	98.4	11.75666	318.9 ± 1.3	0.41%
56	3.10459 ± 0.00198	0.22513 ± 0.00058	0.00272 ± 0.00006	-0.00016 ± 0.00009	0.000065 ± 0.000027	2.17E-14	99.4	13.70425	366.7 ± 1.4	0.37%
57	2.47532 ± 0.00195	0.20790 ± 0.00068	0.00273 ± 0.00010	-0.00001 ± 0.00015	0.000099 ± 0.000025	1.73E-14	98.8	11.76611	319.1 ± 1.5	0.46%
58	2.87180 ± 0.00201	0.23932 ± 0.00061	0.00272 ± 0.00006	0.00025 ± 0.00012	0.000074 ± 0.000024	2.01E-14	99.2	11.90868	322.7 ± 1.2	0.36%
59	5.06356 ± 0.00246	0.37936 ± 0.00102	0.00452 ± 0.00007	0.00063 ± 0.00014	0.000074 ± 0.000021	3.55E-14	99.6	13.28977	356.6 ± 1.1	0.30%
60	3.21110 ± 0.00193	0.26636 ± 0.00084	0.00321 ± 0.00008	0.00043 ± 0.00010	0.000119 ± 0.000023	2.25E-14	98.9	11.92329	323.0 ± 1.3	0.39%
61	2.94629 ± 0.00221	0.24877 ± 0.00021	0.00291 ± 0.00005	-0.00007 ± 0.00012	0.000027 ± 0.000024	2.06E-14	99.7	11.81080	320.2 ± 0.9	0.27%
62	2.04440 ± 0.00376	0.17144 ± 0.00027	0.00200 ± 0.00006	0.00066 ± 0.00010	0.000162 ± 0.000039	1.43E-14	97.7	11.64659	316.2 ± 2.0	0.63%
63	2.36934 ± 0.00207	0.16600 ± 0.00035	0.00215 ± 0.00005	0.00024 ± 0.00008	0.000111 ± 0.000020	1.66E-14	98.6	14.07531	375.6 ± 1.3	0.34%
64	3.99091 ± 0.00240	0.33523 ± 0.00069	0.00417 ± 0.00008	-0.00039 ± 0.00014	0.000116 ± 0.000025	2.79E-14	99.1	11.80272	320.0 ± 0.9	0.29%
65	3.68301 ± 0.00339	0.29621 ± 0.00049	0.00362 ± 0.00006	0.00047 ± 0.00008	0.000096 ± 0.000026	2.58E-14	99.2	12.33788	333.3 ± 0.9	0.28%
66	1.61813 ± 0.00157	0.11857 ± 0.00044	0.00152 ± 0.00004	0.00024 ± 0.00009	0.000038 ± 0.000018	1.13E-14	99.3	13.55352	363.0 ± 1.9	0.52%
67	3.03099 ± 0.00333	0.25247 ± 0.00067	0.00303 ± 0.00007	-0.00029 ± 0.00008	0.000086 ± 0.000020	2.12E-14	99.2	11.90480	322.6 ± 1.1	0.35%
68	2.11846 ± 0.00204	0.17539 ± 0.00041	0.00210 ± 0.00004	0.00025 ± 0.00009	0.000294 ± 0.000023	1.48E-14	95.9	11.58278	314.6 ± 1.3	0.43%
69	3.00369 ± 0.00104	0.25313 ± 0.00053	0.00308 ± 0.00007	0.00070 ± 0.00011	0.000158 ± 0.000026	2.10E-14	98.4	11.68237	317.0 ± 1.1	0.34%
70	4.42301 ± 0.00390	0.37288 ± 0.00063	0.00463 ± 0.00004	0.00868 ± 0.00017	0.000166 ± 0.000023	3.10E-14	98.9	11.73239	318.3 ± 0.8	0.25%
71	2.08225 ± 0.00214	0.17361 ± 0.00053	0.00210 ± 0.00004	0.00025 ± 0.00008	0.000100 ± 0.000022	1.46E-14	98.6	11.82378	320.6 ± 1.5	0.46%
72	2.86090 ± 0.00229	0.19465 ± 0.00048	0.00233 ± 0.00005	0.00057 ± 0.00015	0.000137 ± 0.000022	2.00E-14	98.6	14.49069	385.6 ± 1.4	0.35%
73	1.37283 ± 0.00165	0.11410 ± 0.00034	0.00141 ± 0.00006	0.00067 ± 0.00012	0.000029 ± 0.000022	9.61E-15	99.4	11.95629	323.9 ± 1.9	0.58%
74	2.46308 ± 0.00185	0.20673 ± 0.00040	0.00243 ± 0.00007	0.00020 ± 0.00018	0.000119 ± 0.000022	1.72E-14	98.6	11.74486	318.6 ± 1.1	0.34%
75	2.64109 ± 0.00256	0.16392 ± 0.00038	0.00198 ± 0.00006	0.00022 ± 0.00011	0.000060 ± 0.000024	1.85E-14	99.3	16.00276	421.5 ± 1.6	0.37%

76	3.70080 ± 0.00343	0.30682 ± 0.00064	0.00378 ± 0.00006	0.00215 ± 0.00012	0.000165 ± 0.000022	2.59E-14	98.7	11.90377	322.6 ± 0.9	0.29%
77	2.80503 ± 0.00186	0.23669 ± 0.00067	0.00288 ± 0.00006	-0.00016 ± 0.00008	0.000024 ± 0.000024	1.96E-14	99.8	11.82123	320.5 ± 1.2	0.38%
78	0.90407 ± 0.00078	0.07716 ± 0.00067	0.00081 ± 0.00004	-0.00022 ± 0.00006	0.000036 ± 0.000025	6.33E-15	98.8	11.57761	314.4 ± 3.8	1.22%
79	2.26026 ± 0.00245	0.18516 ± 0.00069	0.00217 ± 0.00005	0.00111 ± 0.00012	0.000054 ± 0.000024	1.58E-14	99.3	12.12172	328.0 ± 1.6	0.50%
80	2.15464 ± 0.00188	0.17971 ± 0.00036	0.00219 ± 0.00004	0.00057 ± 0.00008	0.000198 ± 0.000035	1.51E-14	97.3	11.66530	316.6 ± 1.7	0.54%
81	2.74647 ± 0.00333	0.23173 ± 0.00056	0.00276 ± 0.00006	0.00025 ± 0.00011	0.000071 ± 0.000026	1.92E-14	99.2	11.76204	319.0 ± 1.3	0.39%
82	4.98898 ± 0.00454	0.36104 ± 0.00061	0.00437 ± 0.00007	0.00022 ± 0.00007	0.000135 ± 0.000025	3.49E-14	99.2	13.70777	366.8 ± 0.9	0.24%
83	3.26627 ± 0.00285	0.27596 ± 0.00064	0.00332 ± 0.00006	0.00090 ± 0.00008	0.000061 ± 0.000024	2.29E-14	99.5	11.77102	319.3 ± 1.1	0.33%
84	3.60567 ± 0.00292	0.30052 ± 0.00064	0.00363 ± 0.00006	0.00043 ± 0.00007	0.000104 ± 0.000022	2.53E-14	99.2	11.89618	322.4 ± 0.9	0.29%
85	1.79771 ± 0.00486	0.14472 ± 0.00056	0.00175 ± 0.00004	0.00005 ± 0.00011	0.000012 ± 0.000022	1.26E-14	99.8	12.39623	334.7 ± 2.0	0.60%
86	0.83771 ± 0.00144	0.06232 ± 0.00017	0.00078 ± 0.00006	0.00015 ± 0.00014	0.000010 ± 0.000025	5.87E-15	99.7	13.39610	359.2 ± 3.4	0.95%
87	3.13658 ± 0.00160	0.25367 ± 0.00053	0.00302 ± 0.00005	0.00333 ± 0.00012	0.000269 ± 0.000025	2.20E-14	97.5	12.05238	326.2 ± 1.1	0.33%
88	6.63381 ± 0.00364	0.55954 ± 0.00101	0.00697 ± 0.00005	0.00103 ± 0.00017	0.000201 ± 0.000022	4.65E-14	99.1	11.74967	318.7 ± 0.7	0.21%
89	5.43157 ± 0.00424	0.35812 ± 0.00063	0.00432 ± 0.00008	0.00049 ± 0.00012	0.000058 ± 0.000025	3.80E-14	99.7	15.11963	400.6 ± 0.9	0.24%
90	2.80044 ± 0.00238	0.21609 ± 0.00092	0.00271 ± 0.00003	0.00063 ± 0.00012	0.000143 ± 0.000024	1.96E-14	98.5	12.76455	343.8 ± 1.8	0.51%
91	2.95883 ± 0.00300	0.25081 ± 0.00084	0.00304 ± 0.00006	0.00060 ± 0.00005	0.000038 ± 0.000022	2.07E-14	99.6	11.75275	318.8 ± 1.3	0.41%
92	3.49039 ± 0.00276	0.28924 ± 0.00070	0.00360 ± 0.00008	0.00042 ± 0.00014	0.000107 ± 0.000024	2.44E-14	99.1	11.95793	323.9 ± 1.1	0.33%
93	2.16130 ± 0.00324	0.18095 ± 0.00034	0.00213 ± 0.00007	0.00035 ± 0.00013	-0.000032 ± 0.000035	1.51E-14	100.4	11.94428	323.6 ± 1.7	0.53%
94	2.52132 ± 0.00185	0.21165 ± 0.00077	0.00259 ± 0.00006	-0.00009 ± 0.00014	-0.000035 ± 0.000036	1.77E-14	100.4	11.91276	322.8 ± 1.8	0.56%
95	4.77829 ± 0.00359	0.33986 ± 0.00055	0.00409 ± 0.00005	-0.00015 ± 0.00012	0.000076 ± 0.000038	3.35E-14	99.5	13.99357	373.7 ± 1.1	0.29%
96	1.76965 ± 0.00468	0.11417 ± 0.00043	0.00138 ± 0.00005	0.00006 ± 0.00014	0.000124 ± 0.000036	1.24E-14	97.9	15.17910	402.0 ± 3.1	0.78%
97	2.31278 ± 0.00151	0.19159 ± 0.00080	0.00237 ± 0.00007	0.00210 ± 0.00016	0.000133 ± 0.000036	1.62E-14	98.3	11.86773	321.7 ± 2.0	0.64%
98	4.67593 ± 0.00388	0.38723 ± 0.00054	0.00490 ± 0.00008	0.00089 ± 0.00011	0.000086 ± 0.000027	3.27E-14	99.5	12.01012	325.2 ± 0.8	0.24%
99	6.26787 ± 0.00284	0.43382 ± 0.00103	0.00526 ± 0.00006	0.00094 ± 0.00006	0.000106 ± 0.000027	4.39E-14	99.5	14.37618	382.9 ± 1.1	0.28%
100	2.16225 ± 0.00182	0.13421 ± 0.00064	0.00162 ± 0.00005	0.00045 ± 0.00020	0.000072 ± 0.000026	1.51E-14	99.0	15.95144	420.3 ± 2.5	0.60%
101	2.64032 ± 0.00340	0.22197 ± 0.00068	0.00269 ± 0.00007	0.00019 ± 0.00011	0.000057 ± 0.000026	1.85E-14	99.4	11.81876	320.4 ± 1.4	0.45%
102	3.54402 ± 0.00181	0.28893 ± 0.00116	0.00341 ± 0.00006	0.00006 ± 0.00011	0.000048 ± 0.000027	2.48E-14	99.6	12.21706	330.3 ± 1.5	0.46%
103	1.45171 ± 0.00301	0.12251 ± 0.00050	0.00151 ± 0.00005	0.00003 ± 0.00017	-0.000020 ± 0.000026	1.02E-14	100.4	11.84998	321.2 ± 2.3	0.70%
104	5.39038 ± 0.00549	0.42051 ± 0.00050	0.00534 ± 0.00011	0.00051 ± 0.00009	0.000014 ± 0.000037	3.78E-14	99.9	12.80910	344.9 ± 0.9	0.26%
105	5.82235 ± 0.00495	0.48293 ± 0.00103	0.00585 ± 0.00005	0.00129 ± 0.00007	0.000058 ± 0.000026	4.08E-14	99.7	12.02097	325.5 ± 0.9	0.27%
106	2.41903 ± 0.00247	0.17387 ± 0.00087	0.00211 ± 0.00005	0.00029 ± 0.00008	-0.000025 ± 0.000025	1.69E-14	100.3	13.91260	371.7 ± 2.2	0.60%
107	1.28364 ± 0.00224	0.10708 ± 0.00034	0.00130 ± 0.00006	-0.00007 ± 0.00013	-0.000005 ± 0.000029	8.99E-15	100.1	11.98747	324.6 ± 2.4	0.75%
108	1.76174 ± 0.00254	0.10752 ± 0.00052	0.00137 ± 0.00005	0.00052 ± 0.00013	0.000011 ± 0.000027	1.23E-14	99.8	16.35622	429.8 ± 3.0	0.69%

au18.2b.mus (HDX 1978) Mitchell Moore *j=0.0160505±0.000042 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
1	2.06459 ± 0.00236	0.11790 ± 0.00038	0.00186 ± 0.00006	0.01443 ± 0.00015	0.002029 ± 0.000034	1.45E-14	71.0	12.43828	328.4 ± 2.8	0.85%
2	0.62572 ± 0.00072	0.01690 ± 0.00013	0.00041 ± 0.00006	0.03915 ± 0.00028	0.001338 ± 0.000032	4.38E-15	37.3	13.84372	362.0 ± 17.0	4.69%

3	1.44097 ± 0.00162	0.04481 ± 0.00021	0.00105 ± 0.00006	0.01682 ± 0.00026	0.003094 ± 0.000063	1.01E-14	36.6	11.78557	312.6 ± 12.0	3.84%
4	2.39044 ± 0.00229	0.16935 ± 0.00036	0.00218 ± 0.00006	0.00096 ± 0.00013	0.000987 ± 0.000035	1.67E-14	87.8	12.39440	327.3 ± 1.8	0.56%
5	1.82529 ± 0.00187	0.05966 ± 0.00021	0.00141 ± 0.00006	0.00022 ± 0.00011	0.003490 ± 0.000037	1.28E-14	43.5	13.30998	349.3 ± 5.8	1.67%
6	0.83627 ± 0.00139	0.05685 ± 0.00013	0.00056 ± 0.00008	0.00099 ± 0.00011	0.000465 ± 0.000031	5.86E-15	83.6	12.29345	324.9 ± 4.3	1.34%
7	1.11360 ± 0.00111	0.08881 ± 0.00045	0.00109 ± 0.00004	-0.00007 ± 0.00009	0.000095 ± 0.000027	7.80E-15	97.5	12.22392	323.2 ± 2.9	0.91%
8	0.54673 ± 0.00145	0.03738 ± 0.00013	0.00044 ± 0.00004	0.00015 ± 0.00010	0.000069 ± 0.000029	3.83E-15	96.3	14.07876	367.6 ± 6.2	1.69%
9	1.46522 ± 0.00135	0.11775 ± 0.00029	0.00150 ± 0.00004	0.00025 ± 0.00010	0.000099 ± 0.000027	1.03E-14	98.0	12.19627	322.5 ± 2.0	0.63%
10	0.69061 ± 0.00086	0.05042 ± 0.00028	0.00065 ± 0.00005	0.00009 ± 0.00010	0.000112 ± 0.000026	4.84E-15	95.2	13.04442	343.0 ± 4.5	1.33%
11	0.44068 ± 0.00090	0.02997 ± 0.00019	0.00033 ± 0.00005	0.00028 ± 0.00011	0.000039 ± 0.000032	3.09E-15	97.4	14.32144	373.3 ± 8.5	2.28%
12	0.72347 ± 0.00112	0.04979 ± 0.00040	0.00057 ± 0.00007	0.00006 ± 0.00007	0.000015 ± 0.000025	5.07E-15	99.4	14.44229	376.1 ± 5.0	1.32%
13	0.64736 ± 0.00085	0.05182 ± 0.00024	0.00065 ± 0.00005	-0.00007 ± 0.00012	0.000045 ± 0.000026	4.53E-15	98.0	12.23830	323.5 ± 4.2	1.29%
14	0.71853 ± 0.00093	0.05820 ± 0.00013	0.00062 ± 0.00005	-0.00013 ± 0.00011	0.000124 ± 0.000045	5.03E-15	94.9	11.71632	310.9 ± 6.1	1.95%
15	0.63404 ± 0.00081	0.05012 ± 0.00025	0.00060 ± 0.00006	0.00013 ± 0.00011	0.000086 ± 0.000028	4.44E-15	96.0	12.14415	321.3 ± 4.7	1.46%
16	0.38029 ± 0.00062	0.03052 ± 0.00020	0.00044 ± 0.00007	0.00019 ± 0.00013	0.000166 ± 0.000034	2.66E-15	87.1	10.85267	289.7 ± 9.1	3.14%
17	0.69097 ± 0.00136	0.05548 ± 0.00023	0.00071 ± 0.00005	-0.00008 ± 0.00007	0.000144 ± 0.000035	4.84E-15	93.8	11.68601	310.1 ± 5.1	1.65%
18	0.60724 ± 0.00074	0.04086 ± 0.00023	0.00048 ± 0.00005	0.00027 ± 0.00010	0.000166 ± 0.000039	4.25E-15	91.9	13.66613	357.8 ± 7.8	2.17%
19	5.68674 ± 0.00359	0.32215 ± 0.00052	0.00388 ± 0.00007	0.00067 ± 0.00006	0.000152 ± 0.000034	3.98E-14	99.2	17.51364	446.9 ± 1.1	0.25%
20	0.32827 ± 0.00054	0.02682 ± 0.00012	0.00031 ± 0.00005	0.00012 ± 0.00008	-0.000008 ± 0.000023	2.30E-15	100.8	12.23811	323.5 ± 6.9	2.15%
21	1.56855 ± 0.00112	0.10186 ± 0.00043	0.00126 ± 0.00008	0.00026 ± 0.00011	0.000016 ± 0.000027	1.10E-14	99.7	15.35417	397.4 ± 2.7	0.67%
22	2.73110 ± 0.00130	0.22111 ± 0.00073	0.00274 ± 0.00005	0.00021 ± 0.00013	0.000052 ± 0.000022	1.91E-14	99.4	12.28266	324.6 ± 1.3	0.42%
23	0.97869 ± 0.00140	0.06826 ± 0.00023	0.00083 ± 0.00005	0.00014 ± 0.00008	-0.000026 ± 0.000022	6.85E-15	100.8	14.33735	373.6 ± 2.8	0.76%
24	0.98769 ± 0.00140	0.07760 ± 0.00017	0.00109 ± 0.00006	0.00030 ± 0.00012	-0.000081 ± 0.000032	6.92E-15	102.4	12.72787	335.4 ± 3.3	0.99%
25	2.23310 ± 0.00161	0.19198 ± 0.00081	0.00225 ± 0.00006	0.00003 ± 0.00012	-0.000245 ± 0.000026	1.56E-14	103.2	11.63169	308.8 ± 1.7	0.55%
26	2.20756 ± 0.00255	0.18368 ± 0.00071	0.00209 ± 0.00005	-0.00023 ± 0.00013	-0.000286 ± 0.000032	1.55E-14	103.8	12.01808	318.2 ± 1.9	0.59%
27	0.43321 ± 0.00086	0.03887 ± 0.00016	0.00037 ± 0.00004	-0.00031 ± 0.00009	-0.000468 ± 0.000040	3.03E-15	131.9	11.14427	296.9 ± 8.3	2.80%
28	0.71964 ± 0.00146	0.06753 ± 0.00018	0.00077 ± 0.00007	0.00002 ± 0.00014	-0.000260 ± 0.000040	5.04E-15	110.7	10.65715	284.9 ± 4.8	1.68%
29	2.05979 ± 0.00306	0.16440 ± 0.00063	0.00223 ± 0.00009	0.00005 ± 0.00008	0.000195 ± 0.000051	1.44E-14	97.2	12.17823	322.1 ± 2.8	0.86%
30	2.10913 ± 0.00161	0.17089 ± 0.00042	0.00216 ± 0.00006	-0.00003 ± 0.00010	0.000153 ± 0.000051	1.48E-14	97.9	12.07679	319.6 ± 2.5	0.78%
31	0.35177 ± 0.00086	0.02776 ± 0.00016	0.00050 ± 0.00004	-0.00012 ± 0.00013	0.000126 ± 0.000052	2.46E-15	89.4	11.32726	301.4 ± 14.9	4.93%
32	1.11794 ± 0.00130	0.07061 ± 0.00046	0.00103 ± 0.00005	-0.00026 ± 0.00011	0.000176 ± 0.000051	7.83E-15	95.4	15.09817	391.5 ± 6.2	1.57%
33	1.59561 ± 0.00215	0.13014 ± 0.00048	0.00167 ± 0.00006	0.00031 ± 0.00008	0.000205 ± 0.000042	1.12E-14	96.2	11.79497	312.8 ± 2.8	0.90%
34	1.14044 ± 0.00100	0.09360 ± 0.00048	0.00111 ± 0.00005	0.00013 ± 0.00014	0.000031 ± 0.000029	7.99E-15	99.2	12.08723	319.9 ± 2.9	0.92%
35	1.18456 ± 0.00135	0.09646 ± 0.00039	0.00121 ± 0.00007	0.00026 ± 0.00010	0.000001 ± 0.000029	8.30E-15	100.0	12.27767	324.5 ± 2.7	0.84%
36	1.29429 ± 0.00135	0.10464 ± 0.00039	0.00135 ± 0.00006	0.00036 ± 0.00010	0.000061 ± 0.000028	9.06E-15	98.6	12.19864	322.6 ± 2.4	0.75%
37	0.56781 ± 0.00092	0.04599 ± 0.00019	0.00052 ± 0.00006	0.00008 ± 0.00014	0.000156 ± 0.000034	3.98E-15	91.9	11.34366	301.8 ± 6.0	1.99%
38	1.97851 ± 0.00215	0.13125 ± 0.00061	0.00163 ± 0.00007	0.00000 ± 0.00008	0.000139 ± 0.000035	1.39E-14	97.9	14.76197	383.6 ± 2.8	0.73%
39	2.06146 ± 0.00242	0.14297 ± 0.00046	0.00168 ± 0.00006	0.00030 ± 0.00010	0.000144 ± 0.000034	1.44E-14	97.9	14.12048	368.5 ± 2.2	0.61%
40	0.72003 ± 0.00106	0.05867 ± 0.00037	0.00072 ± 0.00005	0.00060 ± 0.00018	0.000148 ± 0.000034	5.04E-15	94.0	11.53040	306.3 ± 5.0	1.64%
41	0.83802 ± 0.00154	0.06712 ± 0.00035	0.00089 ± 0.00006	0.00005 ± 0.00013	0.000168 ± 0.000034	5.87E-15	94.1	11.74630	311.6 ± 4.4	1.40%

42	0.73445 ± 0.00162	0.05825 ± 0.00033	0.00077 ± 0.00004	0.00002 ± 0.00010	0.000053 ± 0.000019	5.14E-15	97.9	12.33929	326.0 ± 3.2	0.99%
43	3.45636 ± 0.00222	0.23191 ± 0.00067	0.00295 ± 0.00007	0.00004 ± 0.00017	0.000139 ± 0.000021	2.42E-14	98.8	14.72719	382.8 ± 1.3	0.35%
44	1.48906 ± 0.00170	0.12065 ± 0.00062	0.00150 ± 0.00005	0.00005 ± 0.00010	0.000025 ± 0.000024	1.04E-14	99.5	12.28040	324.6 ± 2.3	0.71%
45	0.92377 ± 0.00091	0.06964 ± 0.00036	0.00091 ± 0.00005	0.00001 ± 0.00007	0.000047 ± 0.000021	6.47E-15	98.5	13.06673	343.5 ± 3.0	0.88%
46	0.76007 ± 0.00101	0.05624 ± 0.00025	0.00062 ± 0.00005	-0.00013 ± 0.00008	0.000145 ± 0.000026	5.32E-15	94.4	12.75368	336.0 ± 4.0	1.20%
47	1.24922 ± 0.00100	0.08403 ± 0.00043	0.00104 ± 0.00005	-0.00001 ± 0.00005	0.000000 ± 0.000027	8.75E-15	100.0	14.86582	386.0 ± 3.2	0.82%
48	1.00153 ± 0.00176	0.06969 ± 0.00022	0.00079 ± 0.00007	-0.00004 ± 0.00007	-0.000023 ± 0.000025	7.01E-15	100.7	14.37023	374.4 ± 3.1	0.83%
49	0.89258 ± 0.00123	0.07340 ± 0.00032	0.00078 ± 0.00004	-0.00008 ± 0.00011	0.000007 ± 0.000027	6.25E-15	99.8	12.13145	321.0 ± 3.2	0.99%
50	1.08351 ± 0.00140	0.08862 ± 0.00044	0.00097 ± 0.00005	0.00007 ± 0.00010	0.000032 ± 0.000028	7.59E-15	99.1	12.11916	320.7 ± 2.9	0.92%
51	0.87220 ± 0.00128	0.06117 ± 0.00020	0.00082 ± 0.00005	0.00014 ± 0.00008	-0.000005 ± 0.000028	6.11E-15	100.2	14.25779	371.8 ± 3.8	1.01%
52	0.98380 ± 0.00103	0.07787 ± 0.00026	0.00096 ± 0.00005	0.00006 ± 0.00012	0.000051 ± 0.000026	6.89E-15	98.5	12.44040	328.4 ± 2.9	0.87%
53	0.58194 ± 0.00080	0.04685 ± 0.00020	0.00055 ± 0.00003	-0.00004 ± 0.00012	-0.000031 ± 0.000025	4.08E-15	101.6	12.42009	327.9 ± 4.4	1.33%
54	0.46063 ± 0.00097	0.03326 ± 0.00015	0.00037 ± 0.00004	0.00034 ± 0.00019	-0.000017 ± 0.000024	3.23E-15	101.1	13.85082	362.2 ± 5.9	1.64%
55	1.07003 ± 0.00104	0.07412 ± 0.00046	0.00089 ± 0.00006	0.00021 ± 0.00010	0.000110 ± 0.000042	7.49E-15	97.0	13.99733	365.6 ± 5.0	1.37%
56	1.68552 ± 0.00148	0.10731 ± 0.00043	0.00132 ± 0.00005	-0.00002 ± 0.00010	0.000151 ± 0.000040	1.18E-14	97.4	15.29046	395.9 ± 3.3	0.83%
57	1.36130 ± 0.00059	0.11104 ± 0.00027	0.00140 ± 0.00007	-0.00005 ± 0.00010	0.000128 ± 0.000041	9.53E-15	97.2	11.91919	315.8 ± 3.0	0.95%
58	1.27520 ± 0.00172	0.10267 ± 0.00032	0.00119 ± 0.00006	0.00001 ± 0.00012	0.000152 ± 0.000041	8.93E-15	96.5	11.98262	317.3 ± 3.3	1.05%
59	0.92391 ± 0.00149	0.07340 ± 0.00036	0.00093 ± 0.00005	0.00066 ± 0.00013	0.000106 ± 0.000039	6.47E-15	96.6	12.16073	321.7 ± 4.5	1.41%
60	1.22870 ± 0.00137	0.09813 ± 0.00023	0.00123 ± 0.00006	0.00015 ± 0.00006	0.000048 ± 0.000039	8.60E-15	98.9	12.37754	326.9 ± 3.3	1.00%
61	0.97153 ± 0.00131	0.06171 ± 0.00033	0.00082 ± 0.00006	0.00034 ± 0.00011	0.000350 ± 0.000040	6.80E-15	89.4	14.06880	367.3 ± 5.5	1.49%
62	0.47260 ± 0.00077	0.03824 ± 0.00021	0.00040 ± 0.00005	0.00019 ± 0.00010	0.000057 ± 0.000040	3.31E-15	96.4	11.91885	315.8 ± 8.4	2.65%
63	1.08705 ± 0.00181	0.08771 ± 0.00028	0.00106 ± 0.00006	0.00026 ± 0.00010	0.000095 ± 0.000041	7.61E-15	97.4	12.07458	319.6 ± 3.9	1.21%
64	0.74125 ± 0.00128	0.05237 ± 0.00033	0.00069 ± 0.00005	-0.00016 ± 0.00010	0.000076 ± 0.000027	5.19E-15	97.0	13.72211	359.1 ± 4.7	1.31%
65	0.72326 ± 0.00120	0.05865 ± 0.00016	0.00074 ± 0.00005	0.00017 ± 0.00010	0.000081 ± 0.000032	5.07E-15	96.7	11.92511	316.0 ± 4.3	1.37%
66	0.84264 ± 0.00168	0.06747 ± 0.00024	0.00081 ± 0.00006	-0.00003 ± 0.00005	0.000067 ± 0.000030	5.90E-15	97.6	12.19582	322.5 ± 3.7	1.16%
67	1.30105 ± 0.00195	0.09026 ± 0.00031	0.00117 ± 0.00007	-0.00004 ± 0.00007	0.000024 ± 0.000026	9.11E-15	99.5	14.33691	373.6 ± 2.6	0.71%
68	0.96329 ± 0.00119	0.07019 ± 0.00024	0.00096 ± 0.00005	0.00018 ± 0.00011	0.000247 ± 0.000027	6.75E-15	92.4	12.68474	334.3 ± 3.3	0.98%
69	0.47494 ± 0.00090	0.03541 ± 0.00018	0.00051 ± 0.00005	0.00010 ± 0.00013	0.000091 ± 0.000021	3.33E-15	94.3	12.65441	333.6 ± 5.1	1.52%
70	1.65487 ± 0.00144	0.12486 ± 0.00034	0.00156 ± 0.00009	0.00000 ± 0.00009	0.000044 ± 0.000022	1.16E-14	99.2	13.14906	345.5 ± 1.7	0.49%
71	0.37860 ± 0.00058	0.02730 ± 0.00012	0.00034 ± 0.00005	-0.00009 ± 0.00005	-0.000026 ± 0.000022	2.65E-15	102.1	13.86520	362.5 ± 6.4	1.76%
72	1.53228 ± 0.00130	0.12610 ± 0.00024	0.00157 ± 0.00005	0.00000 ± 0.00009	0.000024 ± 0.000025	1.07E-14	99.5	12.09507	320.1 ± 1.7	0.53%
73	1.00237 ± 0.00132	0.07932 ± 0.00026	0.00106 ± 0.00006	0.00033 ± 0.00007	0.000106 ± 0.000037	7.02E-15	96.9	12.24205	323.6 ± 3.8	1.18%
74	0.78250 ± 0.00073	0.06367 ± 0.00030	0.00078 ± 0.00005	0.00012 ± 0.00009	0.000012 ± 0.000023	5.48E-15	99.5	12.23150	323.4 ± 3.2	0.98%
75	1.06549 ± 0.00151	0.08638 ± 0.00045	0.00106 ± 0.00004	0.00025 ± 0.00010	0.000041 ± 0.000025	7.46E-15	98.9	12.19576	322.5 ± 2.9	0.89%
76	0.82021 ± 0.00212	0.04607 ± 0.00018	0.00051 ± 0.00005	0.00022 ± 0.00009	0.000030 ± 0.000025	5.74E-15	98.9	17.61226	449.1 ± 4.6	1.02%
77	0.60112 ± 0.00091	0.04878 ± 0.00024	0.00059 ± 0.00004	0.00019 ± 0.00009	0.000077 ± 0.000024	4.21E-15	96.2	11.85940	314.4 ± 4.2	1.34%
78	0.61903 ± 0.00100	0.04369 ± 0.00027	0.00054 ± 0.00004	0.00006 ± 0.00010	-0.000005 ± 0.000023	4.34E-15	100.2	14.16790	369.7 ± 4.7	1.26%
79	0.33876 ± 0.00076	0.02726 ± 0.00012	0.00037 ± 0.00004	0.00015 ± 0.00013	0.000007 ± 0.000027	2.37E-15	99.4	12.35027	326.3 ± 8.0	2.46%
80	0.48711 ± 0.00074	0.03893 ± 0.00017	0.00049 ± 0.00005	0.00016 ± 0.00010	0.000027 ± 0.000023	3.41E-15	98.3	12.30379	325.1 ± 4.8	1.48%

81	0.62672 ± 0.00137	0.05056 ± 0.00021	0.00063 ± 0.00006	-0.00003 ± 0.00009	0.000000 ± 0.000023	4.39E-15	100.0	12.39327	327.3 ± 3.9	1.18%
82	0.35847 ± 0.00050	0.02794 ± 0.00016	0.00039 ± 0.00005	-0.00014 ± 0.00013	-0.000193 ± 0.000044	2.51E-15	115.9	12.83089	337.8 ± 12.3	3.64%
83	0.66561 ± 0.00115	0.05318 ± 0.00028	0.00068 ± 0.00005	0.00006 ± 0.00011	-0.000046 ± 0.000034	4.66E-15	102.0	12.51588	330.3 ± 5.4	1.62%
84	1.01743 ± 0.00107	0.08184 ± 0.00033	0.00105 ± 0.00005	0.00020 ± 0.00012	-0.000004 ± 0.000035	7.13E-15	100.1	12.43147	328.2 ± 3.6	1.10%
85	0.58611 ± 0.00132	0.04738 ± 0.00018	0.00073 ± 0.00005	-0.00017 ± 0.00011	-0.000069 ± 0.000035	4.10E-15	103.5	12.36982	326.7 ± 5.9	1.81%
86	0.70166 ± 0.00085	0.04704 ± 0.00018	0.00061 ± 0.00005	-0.00008 ± 0.00011	0.000068 ± 0.000046	4.91E-15	97.1	14.48885	377.2 ± 7.7	2.04%
87	0.60167 ± 0.00114	0.04111 ± 0.00019	0.00057 ± 0.00005	-0.00019 ± 0.00008	0.000057 ± 0.000024	4.21E-15	97.2	14.22494	371.0 ± 4.9	1.31%
88	0.67728 ± 0.00067	0.04690 ± 0.00012	0.00057 ± 0.00005	-0.00005 ± 0.00011	0.000018 ± 0.000024	4.74E-15	99.2	14.32841	373.4 ± 4.1	1.11%
89	0.59179 ± 0.00073	0.04867 ± 0.00015	0.00060 ± 0.00006	-0.00007 ± 0.00009	0.000035 ± 0.000024	4.14E-15	98.3	11.94865	316.5 ± 4.0	1.28%
90	0.61728 ± 0.00125	0.04953 ± 0.00014	0.00058 ± 0.00006	0.00000 ± 0.00014	0.000047 ± 0.000026	4.32E-15	97.8	12.18628	322.3 ± 4.3	1.32%
91	1.00402 ± 0.00169	0.08144 ± 0.00041	0.00093 ± 0.00005	-0.00006 ± 0.00009	0.000028 ± 0.000026	7.03E-15	99.2	12.22909	323.3 ± 3.0	0.93%
92	0.98195 ± 0.00147	0.05476 ± 0.00036	0.00067 ± 0.00004	0.00002 ± 0.00009	0.000017 ± 0.000030	6.88E-15	99.5	17.83938	454.3 ± 5.1	1.13%
93	0.83496 ± 0.00167	0.06128 ± 0.00021	0.00077 ± 0.00005	0.00015 ± 0.00016	0.000065 ± 0.000026	5.85E-15	97.7	13.31351	349.4 ± 3.6	1.03%
94	0.48559 ± 0.00115	0.03960 ± 0.00023	0.00053 ± 0.00004	-0.00012 ± 0.00012	-0.000008 ± 0.000029	3.40E-15	100.5	12.26104	324.1 ± 6.1	1.87%
95	0.29603 ± 0.00040	0.02392 ± 0.00014	0.00027 ± 0.00005	0.00008 ± 0.00008	-0.000028 ± 0.000026	2.07E-15	102.8	12.37768	326.9 ± 8.7	2.66%
96	0.59268 ± 0.00050	0.04885 ± 0.00031	0.00057 ± 0.00005	0.00001 ± 0.00008	-0.000030 ± 0.000024	4.15E-15	101.5	12.13364	321.0 ± 4.4	1.37%
97	0.86484 ± 0.00096	0.06906 ± 0.00033	0.00081 ± 0.00004	-0.00006 ± 0.00013	-0.000034 ± 0.000025	6.06E-15	101.2	12.52246	330.4 ± 3.3	0.99%
98	0.33934 ± 0.00064	0.02753 ± 0.00016	0.00033 ± 0.00005	0.00003 ± 0.00007	0.000011 ± 0.000024	2.38E-15	99.1	12.21008	322.9 ± 7.1	2.19%
99	0.94645 ± 0.00190	0.07707 ± 0.00033	0.00092 ± 0.00006	-0.00009 ± 0.00009	0.000051 ± 0.000030	6.63E-15	98.4	12.08614	319.9 ± 3.4	1.07%
100	0.42356 ± 0.00062	0.03421 ± 0.00021	0.00037 ± 0.00006	-0.00014 ± 0.00016	0.000004 ± 0.000022	2.97E-15	99.8	12.34949	326.2 ± 5.4	1.65%
101	1.07002 ± 0.00184	0.07110 ± 0.00036	0.00071 ± 0.00008	-0.00020 ± 0.00008	0.000022 ± 0.000023	7.49E-15	99.4	14.95911	388.2 ± 3.2	0.83%

au18.3h.mus (HDX 3527) Mitchell Moore *j=0.016400±0.000045 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
1	3.12526 ± 0.00276	0.22962 ± 0.00107	0.00281 ± 0.00007	0.00005 ± 0.00017	0.000182 ± 0.000044	2.19E-14	98.3	13.37599	357.8 ± 2.3	0.64%
2	3.35760 ± 0.00151	0.23217 ± 0.00055	0.00279 ± 0.00005	-0.00047 ± 0.00010	0.000067 ± 0.000029	2.35E-14	99.4	14.37631	381.9 ± 1.4	0.36%
3	2.58114 ± 0.00236	0.21142 ± 0.00039	0.00260 ± 0.00005	0.00069 ± 0.00011	0.000070 ± 0.000043	1.81E-14	99.2	12.11181	326.9 ± 1.7	0.53%
4	2.88571 ± 0.00276	0.23781 ± 0.00073	0.00295 ± 0.00006	0.00029 ± 0.00009	0.000141 ± 0.000040	2.02E-14	98.6	11.95911	323.1 ± 1.7	0.52%
5	3.74537 ± 0.00414	0.26429 ± 0.00071	0.00329 ± 0.00007	0.00040 ± 0.00006	0.000117 ± 0.000047	2.62E-14	99.1	14.04102	373.9 ± 1.8	0.48%
6	2.42625 ± 0.00316	0.20009 ± 0.00053	0.00243 ± 0.00006	0.00006 ± 0.00011	0.000063 ± 0.000049	1.70E-14	99.2	12.03248	324.9 ± 2.2	0.67%
7	3.75654 ± 0.00241	0.30824 ± 0.00086	0.00382 ± 0.00006	0.00104 ± 0.00010	0.000130 ± 0.000041	2.63E-14	99.0	12.06267	325.7 ± 1.4	0.43%
8	3.47948 ± 0.00331	0.23125 ± 0.00036	0.00289 ± 0.00007	0.00050 ± 0.00010	0.000100 ± 0.000050	2.44E-14	99.1	14.91838	394.8 ± 1.8	0.46%
9	3.97289 ± 0.00270	0.23907 ± 0.00064	0.00295 ± 0.00006	-0.00047 ± 0.00019	0.000164 ± 0.000060	2.78E-14	98.8	16.41493	430.1 ± 2.3	0.53%
10	3.57082 ± 0.00277	0.29379 ± 0.00085	0.00350 ± 0.00006	0.00031 ± 0.00008	0.000122 ± 0.000055	2.50E-14	99.0	12.03155	324.9 ± 1.8	0.55%
11	3.68511 ± 0.00326	0.30144 ± 0.00069	0.00375 ± 0.00006	0.00065 ± 0.00010	0.000174 ± 0.000060	2.58E-14	98.6	12.05434	325.4 ± 1.8	0.55%
12	1.46078 ± 0.00296	0.11784 ± 0.00035	0.00150 ± 0.00006	0.00011 ± 0.00010	0.000088 ± 0.000059	1.02E-14	98.2	12.17615	328.5 ± 4.1	1.26%
13	3.93589 ± 0.00284	0.32575 ± 0.00059	0.00413 ± 0.00011	0.00099 ± 0.00021	0.000319 ± 0.000052	2.76E-14	97.6	11.79364	319.0 ± 1.4	0.45%
14	1.24637 ± 0.00157	0.10081 ± 0.00034	0.00127 ± 0.00005	0.00016 ± 0.00008	0.000212 ± 0.000050	8.73E-15	95.0	11.74191	317.7 ± 4.1	1.30%

15	1.33333 ± 0.00136	0.10882 ± 0.00036	0.00131 ± 0.00008	-0.00007 ± 0.00007	0.000031 ± 0.000038	9.34E-15	99.3	12.16823	328.3 ± 3.0	0.93%
16	2.35518 ± 0.00172	0.19630 ± 0.00050	0.00237 ± 0.00007	0.00008 ± 0.00011	0.000047 ± 0.000028	1.65E-14	99.4	11.92753	322.3 ± 1.4	0.44%
17	0.62411 ± 0.00063	0.04891 ± 0.00015	0.00061 ± 0.00006	0.00012 ± 0.00011	0.000151 ± 0.000046	4.37E-15	92.8	11.84546	320.3 ± 7.5	2.35%
18	2.54802 ± 0.00155	0.14911 ± 0.00041	0.00178 ± 0.00006	0.00316 ± 0.00015	0.000150 ± 0.000041	1.78E-14	98.3	16.79252	438.9 ± 2.5	0.56%
19	0.49412 ± 0.00107	0.03814 ± 0.00033	0.00052 ± 0.00004	0.00015 ± 0.00019	0.000027 ± 0.000052	3.46E-15	98.4	12.74775	342.5 ± 11.3	3.29%
20	0.62174 ± 0.00135	0.04746 ± 0.00016	0.00059 ± 0.00004	-0.00006 ± 0.00012	0.000012 ± 0.000048	4.35E-15	99.4	13.02392	349.2 ± 8.2	2.34%
21	3.36565 ± 0.00308	0.27951 ± 0.00057	0.00333 ± 0.00007	0.00047 ± 0.00011	-0.000010 ± 0.000042	2.36E-14	100.1	12.04124	325.1 ± 1.4	0.43%
22	4.73434 ± 0.00409	0.28504 ± 0.00087	0.00348 ± 0.00006	0.00009 ± 0.00012	0.000092 ± 0.000047	3.32E-14	99.4	16.51348	432.4 ± 1.9	0.44%
23	9.27613 ± 0.00589	0.66542 ± 0.00089	0.00802 ± 0.00007	0.00020 ± 0.00014	0.000154 ± 0.000044	6.50E-14	99.5	13.87164	369.8 ± 0.8	0.20%
24	1.08749 ± 0.00179	0.09025 ± 0.00042	0.00101 ± 0.00006	-0.00021 ± 0.00013	0.000018 ± 0.000039	7.62E-15	99.5	11.99011	323.9 ± 3.8	1.18%
25	4.63056 ± 0.00149	0.32331 ± 0.00096	0.00396 ± 0.00006	0.00015 ± 0.00014	0.000103 ± 0.000042	3.24E-14	99.3	14.22815	378.4 ± 1.5	0.40%
26	2.66395 ± 0.00282	0.22065 ± 0.00066	0.00267 ± 0.00005	0.00043 ± 0.00009	0.000036 ± 0.000050	1.87E-14	99.6	12.02563	324.7 ± 2.1	0.64%
27	3.98880 ± 0.00266	0.23972 ± 0.00044	0.00290 ± 0.00006	0.00025 ± 0.00010	0.000035 ± 0.000047	2.79E-14	99.7	16.59625	434.3 ± 1.7	0.40%
28	4.67122 ± 0.00273	0.32371 ± 0.00060	0.00392 ± 0.00006	-0.00002 ± 0.00007	0.000134 ± 0.000035	3.27E-14	99.2	14.30766	380.3 ± 1.1	0.30%
29	1.54386 ± 0.00203	0.11205 ± 0.00031	0.00143 ± 0.00006	0.00000 ± 0.00006	0.000045 ± 0.000038	1.08E-14	99.1	13.65857	364.6 ± 2.9	0.79%
30	5.01303 ± 0.00335	0.35521 ± 0.00095	0.00447 ± 0.00005	0.00066 ± 0.00005	0.000115 ± 0.000043	3.51E-14	99.3	14.01780	373.3 ± 1.4	0.38%
31	3.01626 ± 0.00362	0.21510 ± 0.00059	0.00260 ± 0.00006	0.00032 ± 0.00013	-0.000048 ± 0.000048	2.11E-14	100.5	14.02291	373.4 ± 2.1	0.55%
32	6.13635 ± 0.00441	0.49791 ± 0.00121	0.00600 ± 0.00008	0.00027 ± 0.00009	0.000228 ± 0.000027	4.30E-14	98.9	12.18876	328.8 ± 0.9	0.29%
33	3.83965 ± 0.00213	0.27955 ± 0.00094	0.00347 ± 0.00006	0.00024 ± 0.00010	0.000091 ± 0.000029	2.69E-14	99.3	13.63886	364.2 ± 1.5	0.41%
34	1.95305 ± 0.00266	0.16094 ± 0.00066	0.00196 ± 0.00005	-0.00001 ± 0.00016	0.000111 ± 0.000044	1.37E-14	98.3	11.93139	322.4 ± 2.6	0.81%
35	5.34078 ± 0.00337	0.43883 ± 0.00044	0.00543 ± 0.00008	0.00050 ± 0.00013	0.000106 ± 0.000036	3.74E-14	99.4	12.09904	326.6 ± 0.8	0.23%
36	1.64602 ± 0.00242	0.13029 ± 0.00043	0.00160 ± 0.00004	-0.00010 ± 0.00007	0.000029 ± 0.000039	1.15E-14	99.5	12.56848	338.1 ± 2.7	0.80%
37	4.42464 ± 0.00228	0.36428 ± 0.00102	0.00448 ± 0.00006	-0.00010 ± 0.00011	0.000262 ± 0.000029	3.10E-14	98.3	11.93386	322.5 ± 1.1	0.35%
38	4.35825 ± 0.00438	0.31807 ± 0.00071	0.00390 ± 0.00006	0.00065 ± 0.00019	0.000116 ± 0.000050	3.05E-14	99.2	13.59397	363.1 ± 1.5	0.42%
39	5.22494 ± 0.00182	0.43502 ± 0.00091	0.00522 ± 0.00007	0.00022 ± 0.00015	0.000167 ± 0.000059	3.66E-14	99.1	11.89738	321.6 ± 1.3	0.40%
40	1.62541 ± 0.00093	0.13213 ± 0.00047	0.00157 ± 0.00006	0.00012 ± 0.00010	0.000188 ± 0.000059	1.14E-14	96.6	11.88131	321.2 ± 3.8	1.17%
41	3.64814 ± 0.00158	0.25976 ± 0.00046	0.00311 ± 0.00007	0.00005 ± 0.00011	0.000165 ± 0.000055	2.55E-14	98.7	13.85671	369.4 ± 1.8	0.49%
42	4.44316 ± 0.00196	0.33154 ± 0.00043	0.00407 ± 0.00007	0.00109 ± 0.00007	0.000261 ± 0.000054	3.11E-14	98.3	13.16950	352.8 ± 1.4	0.39%
43	3.66881 ± 0.00257	0.29622 ± 0.00104	0.00384 ± 0.00007	0.00065 ± 0.00010	0.000258 ± 0.000044	2.57E-14	97.9	12.12847	327.3 ± 1.7	0.51%
44	2.37602 ± 0.00182	0.15760 ± 0.00077	0.00196 ± 0.00007	0.00017 ± 0.00019	0.000060 ± 0.000024	1.66E-14	99.3	14.96339	395.9 ± 2.3	0.59%
45	0.66481 ± 0.00072	0.04589 ± 0.00019	0.00065 ± 0.00006	0.00021 ± 0.00018	0.000057 ± 0.000055	4.66E-15	97.5	14.11951	375.8 ± 9.6	2.56%
46	3.00119 ± 0.00420	0.25015 ± 0.00076	0.00315 ± 0.00006	0.00020 ± 0.00018	0.000076 ± 0.000043	2.10E-14	99.3	11.90789	321.8 ± 1.7	0.54%
47	3.28195 ± 0.00277	0.23557 ± 0.00059	0.00293 ± 0.00007	0.00029 ± 0.00009	0.000048 ± 0.000024	2.30E-14	99.6	13.87221	369.8 ± 1.3	0.34%
48	2.92907 ± 0.00242	0.20666 ± 0.00060	0.00251 ± 0.00007	-0.00013 ± 0.00012	0.000194 ± 0.000043	2.05E-14	98.0	13.89678	370.4 ± 2.0	0.54%
49	2.23023 ± 0.00341	0.15680 ± 0.00039	0.00186 ± 0.00007	-0.00020 ± 0.00011	0.000114 ± 0.000035	1.56E-14	98.5	14.00810	373.1 ± 2.1	0.56%
50	2.25589 ± 0.00351	0.13582 ± 0.00039	0.00166 ± 0.00006	0.00041 ± 0.00010	0.000068 ± 0.000028	1.58E-14	99.1	16.46191	431.2 ± 2.1	0.49%
51	3.50088 ± 0.00537	0.24093 ± 0.00052	0.00294 ± 0.00006	0.00033 ± 0.00011	0.000084 ± 0.000035	2.45E-14	99.3	14.42703	383.1 ± 1.5	0.40%
52	3.36000 ± 0.00256	0.23793 ± 0.00107	0.00289 ± 0.00008	0.00037 ± 0.00011	0.000137 ± 0.000046	2.35E-14	98.8	13.95226	371.7 ± 2.3	0.62%
53	4.66150 ± 0.00461	0.33830 ± 0.00083	0.00401 ± 0.00005	0.00022 ± 0.00012	0.000052 ± 0.000054	3.26E-14	99.7	13.73408	366.5 ± 1.6	0.43%

54	3.23857 ± 0.00586	0.24758 ± 0.00049	0.00287 ± 0.00008	0.00031 ± 0.00009	0.000140 ± 0.000056	2.27E-14	98.7	12.91399	346.6 ± 2.0	0.58%
55	1.75474 ± 0.00332	0.12729 ± 0.00038	0.00145 ± 0.00008	0.00008 ± 0.00013	0.000015 ± 0.000064	1.23E-14	99.8	13.75130	366.9 ± 4.2	1.14%
56	2.44903 ± 0.00284	0.20150 ± 0.00068	0.00235 ± 0.00007	0.00137 ± 0.00014	0.000067 ± 0.000046	1.72E-14	99.2	12.05594	325.5 ± 2.2	0.67%
57	4.19680 ± 0.00351	0.30141 ± 0.00081	0.00362 ± 0.00005	0.00828 ± 0.00024	0.000146 ± 0.000065	2.94E-14	99.0	13.78305	367.7 ± 2.0	0.54%
58	2.15135 ± 0.00145	0.17920 ± 0.00051	0.00221 ± 0.00006	0.00007 ± 0.00011	0.000077 ± 0.000051	1.51E-14	98.9	11.87913	321.1 ± 2.5	0.77%
59	0.66713 ± 0.00083	0.04801 ± 0.00035	0.00059 ± 0.00006	0.00008 ± 0.00011	-0.000034 ± 0.000057	4.67E-15	101.5	13.89480	370.3 ± 9.8	2.63%
60	5.49875 ± 0.00287	0.43098 ± 0.00088	0.00532 ± 0.00010	0.00062 ± 0.00012	0.000174 ± 0.000058	3.85E-14	99.1	12.63947	339.8 ± 1.3	0.38%
61	2.19869 ± 0.00274	0.18366 ± 0.00077	0.00228 ± 0.00007	0.00045 ± 0.00011	0.000089 ± 0.000048	1.54E-14	98.8	11.82848	319.9 ± 2.5	0.79%
62	2.30798 ± 0.00174	0.19274 ± 0.00049	0.00235 ± 0.00007	0.00019 ± 0.00009	-0.000001 ± 0.000048	1.62E-14	100.0	11.97471	323.5 ± 2.2	0.67%
63	0.99140 ± 0.00173	0.07428 ± 0.00028	0.00089 ± 0.00005	0.00025 ± 0.00012	0.000158 ± 0.000045	6.94E-15	95.3	12.71838	341.8 ± 5.0	1.48%
64	0.98487 ± 0.00111	0.08168 ± 0.00038	0.00099 ± 0.00005	0.00005 ± 0.00018	0.000169 ± 0.000046	6.90E-15	94.9	11.44757	310.4 ± 4.8	1.55%
65	1.30401 ± 0.00075	0.10741 ± 0.00042	0.00127 ± 0.00005	0.00014 ± 0.00008	0.000033 ± 0.000036	9.13E-15	99.3	12.05021	325.3 ± 3.0	0.91%
66	1.72445 ± 0.00186	0.14190 ± 0.00058	0.00175 ± 0.00006	0.00034 ± 0.00011	0.000108 ± 0.000053	1.21E-14	98.1	11.92724	322.3 ± 3.3	1.02%
67	2.48147 ± 0.00316	0.16848 ± 0.00068	0.00210 ± 0.00006	0.00090 ± 0.00013	0.000128 ± 0.000030	1.74E-14	98.5	14.50484	385.0 ± 2.2	0.56%
68	3.35212 ± 0.00365	0.22535 ± 0.00057	0.00277 ± 0.00007	-0.00003 ± 0.00011	0.000204 ± 0.000045	2.35E-14	98.2	14.60786	387.5 ± 1.9	0.49%
69	0.47819 ± 0.00113	0.03408 ± 0.00014	0.00048 ± 0.00005	-0.00010 ± 0.00010	0.000011 ± 0.000050	3.35E-15	99.3	13.93682	371.4 ± 11.7	3.16%
70	1.45332 ± 0.00154	0.12093 ± 0.00034	0.00149 ± 0.00006	-0.00031 ± 0.00016	0.000089 ± 0.000039	1.02E-14	98.2	11.79925	319.1 ± 2.8	0.86%
71	1.56394 ± 0.00169	0.12999 ± 0.00048	0.00153 ± 0.00006	-0.00002 ± 0.00014	0.000063 ± 0.000043	1.10E-14	98.8	11.88839	321.3 ± 3.0	0.92%
72	2.77121 ± 0.00309	0.23145 ± 0.00043	0.00272 ± 0.00005	-0.00009 ± 0.00012	-0.000006 ± 0.000045	1.94E-14	100.1	11.97301	323.4 ± 1.7	0.53%
73	1.72865 ± 0.00145	0.13714 ± 0.00031	0.00168 ± 0.00005	-0.00008 ± 0.00006	0.000286 ± 0.000047	1.21E-14	95.1	11.98873	323.8 ± 2.8	0.88%
74	2.37741 ± 0.00145	0.19944 ± 0.00052	0.00247 ± 0.00005	-0.00001 ± 0.00014	0.000129 ± 0.000042	1.66E-14	98.4	11.72970	317.4 ± 1.9	0.60%
75	2.47110 ± 0.00213	0.17608 ± 0.00086	0.00214 ± 0.00006	-0.00013 ± 0.00014	0.000092 ± 0.000056	1.73E-14	98.9	13.87898	370.0 ± 3.1	0.84%
76	0.95932 ± 0.00082	0.07915 ± 0.00030	0.00100 ± 0.00006	-0.00002 ± 0.00010	0.000183 ± 0.000048	6.72E-15	94.4	11.43817	310.2 ± 5.0	1.61%
77	1.59453 ± 0.00201	0.10989 ± 0.00034	0.00131 ± 0.00005	0.00019 ± 0.00013	0.000180 ± 0.000051	1.12E-14	96.7	14.02613	373.5 ± 3.8	1.03%
78	1.76845 ± 0.00150	0.12159 ± 0.00057	0.00147 ± 0.00004	0.00046 ± 0.00011	0.000069 ± 0.000034	1.24E-14	98.9	14.37763	381.9 ± 2.8	0.74%
79	0.87393 ± 0.00116	0.06293 ± 0.00016	0.00080 ± 0.00004	0.00002 ± 0.00011	0.000140 ± 0.000040	6.12E-15	95.3	13.23060	354.3 ± 5.2	1.46%
80	3.18116 ± 0.00428	0.23922 ± 0.00079	0.00301 ± 0.00006	-0.00041 ± 0.00013	0.000041 ± 0.000044	2.23E-14	99.6	13.24672	354.7 ± 1.9	0.55%
81	0.91278 ± 0.00240	0.07551 ± 0.00038	0.00099 ± 0.00005	0.00008 ± 0.00011	0.000026 ± 0.000039	6.39E-15	99.1	11.98529	323.7 ± 4.5	1.40%
82	1.85203 ± 0.00237	0.13035 ± 0.00045	0.00159 ± 0.00007	0.00043 ± 0.00012	0.000057 ± 0.000047	1.30E-14	99.1	14.07796	374.8 ± 3.2	0.84%
83	1.57518 ± 0.00482	0.13062 ± 0.00070	0.00153 ± 0.00005	-0.00001 ± 0.00009	0.000072 ± 0.000039	1.10E-14	98.7	11.89698	321.6 ± 3.1	0.96%
84	1.62179 ± 0.00198	0.13352 ± 0.00045	0.00165 ± 0.00007	0.00004 ± 0.00010	0.000110 ± 0.000044	1.14E-14	98.0	11.90295	321.7 ± 2.9	0.90%
85	0.99855 ± 0.00249	0.06881 ± 0.00037	0.00081 ± 0.00005	-0.00003 ± 0.00010	0.000113 ± 0.000045	6.99E-15	96.7	14.02546	373.5 ± 5.6	1.51%
86	0.63897 ± 0.00174	0.04315 ± 0.00018	0.00052 ± 0.00004	0.00013 ± 0.00013	-0.000001 ± 0.000049	4.47E-15	100.1	14.80913	392.2 ± 9.0	2.30%
87	2.52262 ± 0.00203	0.17676 ± 0.00050	0.00222 ± 0.00006	0.00030 ± 0.00014	-0.000003 ± 0.000047	1.77E-14	100.0	14.27149	379.4 ± 2.4	0.62%
88	1.58172 ± 0.00133	0.13238 ± 0.00043	0.00163 ± 0.00006	0.00012 ± 0.00011	0.000020 ± 0.000041	1.11E-14	99.6	11.90290	321.7 ± 2.7	0.84%
89	4.78364 ± 0.00490	0.31648 ± 0.00095	0.00392 ± 0.00006	0.00034 ± 0.00012	0.000039 ± 0.000040	3.35E-14	99.8	15.07845	398.6 ± 1.6	0.40%
90	1.91636 ± 0.00206	0.15226 ± 0.00033	0.00193 ± 0.00004	-0.00010 ± 0.00010	0.000338 ± 0.000045	1.34E-14	94.8	11.93091	322.4 ± 2.5	0.77%
91	2.52736 ± 0.00254	0.16851 ± 0.00047	0.00208 ± 0.00005	0.00039 ± 0.00009	0.000035 ± 0.000044	1.77E-14	99.6	14.93641	395.3 ± 2.3	0.59%
92	1.86166 ± 0.00192	0.15569 ± 0.00067	0.00192 ± 0.00006	-0.00009 ± 0.00010	-0.000010 ± 0.000052	1.30E-14	100.2	11.95765	323.1 ± 3.0	0.94%

93	1.24958 ± 0.00221	0.10103 ± 0.00041	0.00118 ± 0.00005	-0.00012 ± 0.00019	0.000046 ± 0.000027	8.75E-15	98.9	12.23349	329.9 ± 2.6	0.79%
94	2.67003 ± 0.00226	0.18399 ± 0.00049	0.00211 ± 0.00008	0.00033 ± 0.00015	0.000082 ± 0.000041	1.87E-14	99.1	14.37989	382.0 ± 2.0	0.53%
95	0.58141 ± 0.00123	0.04371 ± 0.00014	0.00042 ± 0.00005	0.00027 ± 0.00013	0.000081 ± 0.000042	4.07E-15	95.9	12.75294	342.6 ± 7.7	2.25%
96	2.08732 ± 0.00201	0.15336 ± 0.00052	0.00184 ± 0.00004	0.00020 ± 0.00008	-0.000021 ± 0.000041	1.46E-14	100.3	13.61056	363.5 ± 2.5	0.68%
97	0.89636 ± 0.00127	0.07087 ± 0.00029	0.00094 ± 0.00005	0.00045 ± 0.00015	0.000062 ± 0.000036	6.28E-15	98.0	12.39094	333.7 ± 4.3	1.28%
98	0.45545 ± 0.00091	0.03532 ± 0.00024	0.00048 ± 0.00004	0.00033 ± 0.00012	0.000066 ± 0.000025	3.19E-15	95.7	12.34516	332.6 ± 6.2	1.87%
99	2.88418 ± 0.00306	0.23411 ± 0.00058	0.00292 ± 0.00004	0.00048 ± 0.00016	0.000070 ± 0.000049	2.02E-14	99.3	12.23135	329.8 ± 1.9	0.58%
100	3.91518 ± 0.00383	0.32605 ± 0.00108	0.00395 ± 0.00005	0.00027 ± 0.00012	0.000134 ± 0.000046	2.74E-14	99.0	11.88667	321.3 ± 1.6	0.49%
101	1.12435 ± 0.00142	0.07817 ± 0.00030	0.00102 ± 0.00005	0.00006 ± 0.00018	0.000020 ± 0.000043	7.87E-15	99.5	14.30739	380.3 ± 4.5	1.20%
102	0.75179 ± 0.00120	0.06261 ± 0.00027	0.00077 ± 0.00005	-0.00011 ± 0.00013	-0.000018 ± 0.000050	5.27E-15	100.7	12.00795	324.3 ± 6.5	2.00%
103	0.61633 ± 0.00078	0.05099 ± 0.00025	0.00064 ± 0.00007	0.00007 ± 0.00014	0.000058 ± 0.000042	4.32E-15	97.2	11.75003	317.9 ± 6.8	2.13%
104	1.18482 ± 0.00202	0.08179 ± 0.00040	0.00100 ± 0.00005	0.00026 ± 0.00009	0.000026 ± 0.000046	8.30E-15	99.3	14.39063	382.3 ± 4.9	1.27%
105	2.63266 ± 0.00357	0.17420 ± 0.00036	0.00213 ± 0.00007	0.00002 ± 0.00010	0.000218 ± 0.000048	1.84E-14	97.6	14.74277	390.7 ± 2.4	0.61%
106	0.99659 ± 0.00105	0.06820 ± 0.00027	0.00084 ± 0.00006	-0.00014 ± 0.00013	0.000032 ± 0.000050	6.98E-15	99.1	14.47513	384.3 ± 6.0	1.55%
107	1.88787 ± 0.00147	0.12975 ± 0.00051	0.00162 ± 0.00006	0.00033 ± 0.00011	0.000062 ± 0.000051	1.32E-14	99.0	14.40917	382.7 ± 3.5	0.90%

au18.2c.mus (HDX 4271) Mitchell Moore *j=0.015937±0.0000155 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
1	1.21238 ± 0.00147	0.08311 ± 0.00043	0.00109 ± 0.00007	0.00061 ± 0.00012	0.000082 ± 0.000021	8.49E-15	98.0	14.29687	370.3 ± 2.8	0.75%
2	0.66330 ± 0.00149	0.05181 ± 0.00011	0.00068 ± 0.00005	0.00061 ± 0.00008	0.000101 ± 0.000027	4.65E-15	95.5	12.22706	321.2 ± 4.2	1.29%
3	1.04349 ± 0.00142	0.08384 ± 0.00044	0.00129 ± 0.00011	0.00056 ± 0.00009	0.000103 ± 0.000023	7.31E-15	97.1	12.08174	317.7 ± 2.8	0.87%
4	0.77248 ± 0.00147	0.06115 ± 0.00014	0.00060 ± 0.00008	0.00025 ± 0.00013	0.000062 ± 0.000026	5.41E-15	97.6	12.33424	323.8 ± 3.4	1.05%
5	0.85048 ± 0.00167	0.06686 ± 0.00027	0.00092 ± 0.00006	0.00097 ± 0.00011	0.000054 ± 0.000027	5.96E-15	98.1	12.48270	327.3 ± 3.5	1.05%
6	0.54525 ± 0.00082	0.04328 ± 0.00009	0.00052 ± 0.00004	-0.00048 ± 0.00016	0.000009 ± 0.000023	3.82E-15	99.5	12.53658	328.6 ± 4.1	1.26%
7	0.70245 ± 0.00100	0.05594 ± 0.00018	0.00062 ± 0.00006	-0.00021 ± 0.00013	0.000026 ± 0.000023	4.92E-15	98.9	12.42072	325.8 ± 3.4	1.06%
8	0.38988 ± 0.00102	0.02711 ± 0.00012	0.00036 ± 0.00007	0.00003 ± 0.00010	0.000024 ± 0.000020	2.73E-15	98.2	14.11559	366.1 ± 6.0	1.64%
9	0.34391 ± 0.00057	0.02708 ± 0.00009	0.00036 ± 0.00005	-0.00025 ± 0.00009	-0.000096 ± 0.000040	2.41E-15	108.2	12.69703	332.5 ± 11.5	3.47%
10	0.70841 ± 0.00179	0.05610 ± 0.00041	0.00069 ± 0.00006	0.00010 ± 0.00008	0.000053 ± 0.000023	4.96E-15	97.8	12.34831	324.1 ± 4.0	1.24%
11	0.63360 ± 0.00087	0.04408 ± 0.00033	0.00057 ± 0.00006	0.00012 ± 0.00007	0.000025 ± 0.000025	4.44E-15	98.8	14.20611	368.2 ± 5.2	1.41%
12	1.60421 ± 0.00251	0.09438 ± 0.00047	0.00122 ± 0.00006	0.00035 ± 0.00012	0.000209 ± 0.000028	1.12E-14	96.2	16.34366	417.6 ± 3.2	0.77%
13	0.86163 ± 0.00174	0.05523 ± 0.00026	0.00075 ± 0.00007	-0.00010 ± 0.00010	0.000012 ± 0.000029	6.03E-15	99.6	15.53555	399.1 ± 4.5	1.14%
14	2.26552 ± 0.00147	0.16601 ± 0.00041	0.00194 ± 0.00009	0.00010 ± 0.00009	0.000075 ± 0.000027	1.59E-14	99.0	13.51297	351.9 ± 1.6	0.44%
15	0.81287 ± 0.00049	0.06588 ± 0.00035	0.00068 ± 0.00006	0.00034 ± 0.00006	0.000106 ± 0.000043	5.69E-15	96.2	11.86459	312.4 ± 5.4	1.73%
16	1.04122 ± 0.00116	0.08478 ± 0.00045	0.00097 ± 0.00006	0.00045 ± 0.00009	0.000120 ± 0.000044	7.29E-15	96.6	11.86448	312.4 ± 4.4	1.41%
17	0.71245 ± 0.00135	0.05637 ± 0.00035	0.00067 ± 0.00006	0.00041 ± 0.00009	0.000119 ± 0.000045	4.99E-15	95.1	12.01707	316.1 ± 6.5	2.07%
18	2.36140 ± 0.00146	0.19032 ± 0.00054	0.00230 ± 0.00005	0.00286 ± 0.00013	0.000123 ± 0.000042	1.65E-14	98.5	12.21828	321.0 ± 1.9	0.61%
19	0.65068 ± 0.00154	0.05236 ± 0.00023	0.00049 ± 0.00005	0.00008 ± 0.00014	0.000006 ± 0.000027	4.56E-15	99.7	12.39429	325.2 ± 4.4	1.34%
20	0.70265 ± 0.00164	0.05728 ± 0.00033	0.00059 ± 0.00005	0.00020 ± 0.00008	-0.000029 ± 0.000028	4.92E-15	101.2	12.26683	322.1 ± 4.3	1.34%

21	1.19643 ± 0.00077	0.08385 ± 0.00039	0.00098 ± 0.00005	0.00020 ± 0.00007	-0.000017 ± 0.000026	8.38E-15	100.4	14.26806	369.6 ± 2.9	0.79%
22	0.39425 ± 0.00094	0.03097 ± 0.00018	0.00030 ± 0.00005	0.00009 ± 0.00013	-0.000030 ± 0.000024	2.76E-15	102.2	12.73057	333.3 ± 6.3	1.89%
23	0.34748 ± 0.00063	0.02814 ± 0.00019	0.00027 ± 0.00006	-0.00007 ± 0.00010	-0.000038 ± 0.000026	2.43E-15	103.2	12.34645	324.1 ± 7.5	2.32%
24	0.57305 ± 0.00089	0.04674 ± 0.00031	0.00053 ± 0.00005	0.00011 ± 0.00013	0.000041 ± 0.000022	4.01E-15	97.9	11.99980	315.7 ± 4.3	1.35%
25	0.41018 ± 0.00061	0.03307 ± 0.00022	0.00039 ± 0.00005	0.00006 ± 0.00011	0.000010 ± 0.000027	2.87E-15	99.3	12.31213	323.2 ± 6.7	2.07%
26	0.34615 ± 0.00038	0.02718 ± 0.00012	0.00030 ± 0.00005	0.00018 ± 0.00012	0.000100 ± 0.000023	2.42E-15	91.5	11.65313	307.3 ± 6.9	2.25%
27	0.89435 ± 0.00144	0.07154 ± 0.00032	0.00087 ± 0.00006	0.00017 ± 0.00008	0.000086 ± 0.000025	6.26E-15	97.2	12.14672	319.2 ± 3.2	0.99%
28	0.33563 ± 0.00058	0.02353 ± 0.00014	0.00030 ± 0.00005	0.00013 ± 0.00009	-0.000067 ± 0.000038	2.35E-15	105.9	14.26379	369.5 ± 12.5	3.40%
29	0.29290 ± 0.00032	0.02299 ± 0.00012	0.00028 ± 0.00004	0.00019 ± 0.00008	0.000017 ± 0.000027	2.05E-15	98.3	12.52354	328.3 ± 9.4	2.86%
30	1.00510 ± 0.00140	0.08213 ± 0.00032	0.00095 ± 0.00005	0.00010 ± 0.00011	0.000012 ± 0.000023	7.04E-15	99.6	12.19551	320.4 ± 2.5	0.79%
31	1.44715 ± 0.00139	0.10120 ± 0.00040	0.00117 ± 0.00005	0.00049 ± 0.00009	0.000051 ± 0.000026	1.01E-14	99.0	14.14992	366.9 ± 2.5	0.68%
32	0.87267 ± 0.00113	0.05716 ± 0.00017	0.00072 ± 0.00006	-0.00007 ± 0.00007	-0.000005 ± 0.000025	6.11E-15	100.2	15.26823	392.9 ± 3.5	0.89%
33	1.09370 ± 0.00240	0.08897 ± 0.00033	0.00106 ± 0.00005	0.00007 ± 0.00012	-0.000001 ± 0.000023	7.66E-15	100.0	12.29347	322.8 ± 2.5	0.76%
34	0.99219 ± 0.00125	0.06451 ± 0.00016	0.00084 ± 0.00005	-0.00005 ± 0.00011	0.000028 ± 0.000027	6.95E-15	99.2	15.25131	392.5 ± 3.3	0.85%
35	1.47239 ± 0.00233	0.12079 ± 0.00048	0.00151 ± 0.00005	-0.00035 ± 0.00018	0.000065 ± 0.000024	1.03E-14	98.7	12.03034	316.4 ± 2.1	0.66%
36	0.29013 ± 0.00043	0.02334 ± 0.00017	0.00033 ± 0.00006	0.00014 ± 0.00014	0.000011 ± 0.000025	2.03E-15	98.9	12.29710	322.9 ± 8.7	2.70%
37	0.56941 ± 0.00103	0.04325 ± 0.00023	0.00043 ± 0.00008	0.00006 ± 0.00014	0.000054 ± 0.000026	3.99E-15	97.2	12.79830	334.9 ± 5.0	1.48%
38	1.18773 ± 0.00138	0.08089 ± 0.00027	0.00092 ± 0.00005	-0.00004 ± 0.00007	0.000006 ± 0.000026	8.32E-15	99.8	14.66064	378.8 ± 2.8	0.73%
39	4.17884 ± 0.00304	0.27586 ± 0.00070	0.00322 ± 0.00007	0.00090 ± 0.00010	0.000045 ± 0.000026	2.93E-14	99.7	15.10027	389.0 ± 1.3	0.32%
40	1.52035 ± 0.00163	0.11656 ± 0.00044	0.00142 ± 0.00005	0.00028 ± 0.00009	0.000133 ± 0.000025	1.06E-14	97.4	12.70594	332.7 ± 2.1	0.64%
41	0.31398 ± 0.00056	0.02443 ± 0.00009	0.00024 ± 0.00004	0.00003 ± 0.00006	0.000015 ± 0.000023	2.20E-15	98.6	12.66936	331.8 ± 7.5	2.27%
42	0.84237 ± 0.00080	0.06235 ± 0.00026	0.00075 ± 0.00005	0.00013 ± 0.00015	-0.000006 ± 0.000027	5.90E-15	100.2	13.51113	351.8 ± 3.7	1.04%
43	0.92717 ± 0.00086	0.07405 ± 0.00033	0.00103 ± 0.00006	0.00009 ± 0.00011	0.000191 ± 0.000048	6.49E-15	93.9	11.76092	309.9 ± 5.2	1.69%
44	1.07833 ± 0.00176	0.08775 ± 0.00058	0.00116 ± 0.00006	0.00037 ± 0.00010	-0.000024 ± 0.000051	7.55E-15	100.7	12.28949	322.7 ± 5.0	1.56%
45	1.23609 ± 0.00209	0.09945 ± 0.00033	0.00128 ± 0.00006	0.00007 ± 0.00011	0.000061 ± 0.000038	8.66E-15	98.6	12.24897	321.7 ± 3.2	0.99%
46	0.84760 ± 0.00170	0.06811 ± 0.00034	0.00091 ± 0.00005	0.00016 ± 0.00008	0.000138 ± 0.000035	5.94E-15	95.2	11.84539	312.0 ± 4.4	1.41%
47	4.37949 ± 0.00319	0.27044 ± 0.00048	0.00329 ± 0.00006	0.00034 ± 0.00008	0.000062 ± 0.000039	3.07E-14	99.6	16.12604	412.6 ± 1.3	0.33%
48	0.67707 ± 0.00102	0.05442 ± 0.00033	0.00067 ± 0.00007	0.00075 ± 0.00021	0.000018 ± 0.000025	4.74E-15	99.2	12.34312	324.0 ± 4.2	1.29%
49	3.29136 ± 0.00569	0.19677 ± 0.00071	0.00237 ± 0.00007	0.00097 ± 0.00010	0.000046 ± 0.000026	2.31E-14	99.6	16.65801	424.8 ± 2.0	0.47%
50	2.21970 ± 0.00240	0.15462 ± 0.00046	0.00178 ± 0.00006	0.00044 ± 0.00013	-0.000082 ± 0.000045	1.55E-14	101.1	14.35609	371.7 ± 2.5	0.68%
51	0.74250 ± 0.00149	0.05781 ± 0.00017	0.00072 ± 0.00006	0.00003 ± 0.00009	0.000054 ± 0.000024	5.20E-15	97.8	12.56651	329.3 ± 3.4	1.03%
52	1.57407 ± 0.00200	0.11161 ± 0.00030	0.00136 ± 0.00008	0.00033 ± 0.00012	0.000054 ± 0.000022	1.10E-14	99.0	13.96160	362.4 ± 1.8	0.51%
53	1.13455 ± 0.00198	0.09087 ± 0.00030	0.00110 ± 0.00006	0.00023 ± 0.00012	0.000065 ± 0.000027	7.95E-15	98.3	12.27541	322.3 ± 2.6	0.81%
54	1.95113 ± 0.00176	0.15509 ± 0.00043	0.00192 ± 0.00007	-0.00004 ± 0.00008	0.000136 ± 0.000028	1.37E-14	97.9	12.32229	323.5 ± 1.7	0.52%
55	1.17096 ± 0.00104	0.07583 ± 0.00024	0.00094 ± 0.00004	0.00011 ± 0.00009	0.000069 ± 0.000027	8.20E-15	98.3	15.17518	390.8 ± 3.0	0.77%
56	2.23424 ± 0.00281	0.18169 ± 0.00032	0.00220 ± 0.00005	0.00021 ± 0.00013	0.000035 ± 0.000025	1.56E-14	99.5	12.24048	321.5 ± 1.3	0.39%
57	1.10566 ± 0.00123	0.09008 ± 0.00049	0.00101 ± 0.00006	0.00005 ± 0.00010	0.000094 ± 0.000025	7.74E-15	97.5	11.96626	314.9 ± 2.8	0.90%
58	0.62971 ± 0.00124	0.04989 ± 0.00017	0.00060 ± 0.00005	0.00030 ± 0.00010	0.000040 ± 0.000026	4.41E-15	98.1	12.38725	325.0 ± 4.3	1.32%
59	1.24083 ± 0.00166	0.10058 ± 0.00040	0.00120 ± 0.00005	0.00050 ± 0.00008	0.000060 ± 0.000028	8.69E-15	98.6	12.16025	319.6 ± 2.6	0.80%

60	2.30603 ± 0.00250	0.17225 ± 0.00047	0.00211 ± 0.00005	0.00031 ± 0.00008	0.000058 ± 0.000029	1.61E-14	99.3	13.28757	346.5 ± 1.6	0.47%
61	1.64609 ± 0.00069	0.13310 ± 0.00058	0.00155 ± 0.00005	0.00039 ± 0.00011	0.000134 ± 0.000027	1.15E-14	97.6	12.07030	317.4 ± 2.1	0.67%
62	0.97388 ± 0.00081	0.07870 ± 0.00029	0.00096 ± 0.00005	0.00021 ± 0.00011	0.000026 ± 0.000026	6.82E-15	99.2	12.27935	322.4 ± 2.9	0.89%
63	0.86062 ± 0.00112	0.04781 ± 0.00024	0.00060 ± 0.00004	0.00007 ± 0.00010	0.000070 ± 0.000040	6.03E-15	97.6	17.57108	445.4 ± 6.7	1.50%
64	0.99986 ± 0.00091	0.07858 ± 0.00023	0.00097 ± 0.00006	-0.00010 ± 0.00011	0.000170 ± 0.000042	7.00E-15	95.0	12.08409	317.7 ± 4.3	1.36%
65	2.17753 ± 0.00226	0.15309 ± 0.00050	0.00188 ± 0.00006	0.00069 ± 0.00010	0.000099 ± 0.000041	1.52E-14	98.7	14.03424	364.2 ± 2.4	0.66%
66	1.04172 ± 0.00169	0.08435 ± 0.00042	0.00104 ± 0.00005	0.00018 ± 0.00012	0.000037 ± 0.000041	7.30E-15	98.9	12.21905	321.0 ± 4.2	1.30%
67	1.09741 ± 0.00142	0.08800 ± 0.00048	0.00110 ± 0.00006	-0.00013 ± 0.00006	0.000084 ± 0.000041	7.69E-15	97.7	12.18860	320.3 ± 4.1	1.28%
68	1.73814 ± 0.00197	0.13797 ± 0.00075	0.00173 ± 0.00006	0.00018 ± 0.00011	0.000031 ± 0.000027	1.22E-14	99.5	12.53134	328.5 ± 2.4	0.73%
69	1.56138 ± 0.00167	0.12394 ± 0.00033	0.00150 ± 0.00005	0.00026 ± 0.00012	0.000049 ± 0.000025	1.09E-14	99.1	12.48245	327.3 ± 1.8	0.56%
70	0.77407 ± 0.00166	0.06149 ± 0.00025	0.00080 ± 0.00006	-0.00001 ± 0.00008	0.000024 ± 0.000026	5.42E-15	99.1	12.47438	327.1 ± 3.6	1.09%
71	0.83894 ± 0.00137	0.06690 ± 0.00019	0.00089 ± 0.00005	-0.00008 ± 0.00012	0.000009 ± 0.000026	5.88E-15	99.7	12.49860	327.7 ± 3.1	0.96%
72	2.63558 ± 0.00148	0.17897 ± 0.00044	0.00206 ± 0.00007	-0.00026 ± 0.00009	0.000017 ± 0.000022	1.85E-14	99.8	14.69744	379.7 ± 1.4	0.36%
73	2.60240 ± 0.00308	0.15769 ± 0.00048	0.00182 ± 0.00005	-0.00027 ± 0.00010	0.000061 ± 0.000024	1.82E-14	99.3	16.38991	418.7 ± 1.8	0.43%
74	2.06060 ± 0.00196	0.16653 ± 0.00042	0.00200 ± 0.00005	0.00009 ± 0.00011	0.000067 ± 0.000023	1.44E-14	99.0	12.25431	321.8 ± 1.4	0.43%
75	1.71813 ± 0.00253	0.11899 ± 0.00027	0.00134 ± 0.00004	0.00038 ± 0.00011	0.000089 ± 0.000021	1.20E-14	98.5	14.21871	368.5 ± 1.7	0.46%
76	2.76265 ± 0.00155	0.19769 ± 0.00075	0.00228 ± 0.00008	0.00059 ± 0.00006	0.000039 ± 0.000024	1.93E-14	99.6	13.91605	361.4 ± 1.7	0.46%
77	3.90379 ± 0.00166	0.31695 ± 0.00071	0.00381 ± 0.00008	0.00022 ± 0.00010	0.000182 ± 0.000045	2.73E-14	98.6	12.14742	319.3 ± 1.3	0.42%
78	3.10666 ± 0.00297	0.23120 ± 0.00037	0.00278 ± 0.00007	0.00068 ± 0.00010	0.000124 ± 0.000028	2.18E-14	98.8	13.27884	346.3 ± 1.1	0.33%
79	1.88705 ± 0.00208	0.11437 ± 0.00037	0.00121 ± 0.00007	0.00015 ± 0.00013	-0.000034 ± 0.000029	1.32E-14	100.5	16.49945	421.2 ± 2.4	0.57%
80	1.12636 ± 0.00165	0.07782 ± 0.00032	0.00088 ± 0.00007	-0.00042 ± 0.00015	0.000006 ± 0.000026	7.89E-15	99.8	14.44849	373.9 ± 3.1	0.82%
81	0.27859 ± 0.00039	0.02228 ± 0.00016	0.00020 ± 0.00004	-0.00003 ± 0.00011	-0.000075 ± 0.000042	1.95E-15	108.0	12.50649	327.9 ± 14.7	4.47%
82	1.05750 ± 0.00167	0.08224 ± 0.00024	0.00105 ± 0.00006	0.00045 ± 0.00009	0.000128 ± 0.000027	7.41E-15	96.4	12.39812	325.3 ± 2.8	0.85%
83	2.21941 ± 0.00156	0.17719 ± 0.00042	0.00225 ± 0.00005	0.00033 ± 0.00010	0.000180 ± 0.000026	1.55E-14	97.6	12.22571	321.1 ± 1.4	0.44%
84	0.57421 ± 0.00090	0.04547 ± 0.00021	0.00049 ± 0.00005	0.00019 ± 0.00012	0.000044 ± 0.000028	4.02E-15	97.7	12.33997	323.9 ± 5.1	1.57%
85	0.46855 ± 0.00116	0.03767 ± 0.00017	0.00049 ± 0.00006	0.00049 ± 0.00011	0.000042 ± 0.000027	3.28E-15	97.3	12.10810	318.3 ± 5.8	1.81%
86	2.95146 ± 0.00328	0.23776 ± 0.00072	0.00285 ± 0.00008	0.00038 ± 0.00011	0.000043 ± 0.000029	2.07E-14	99.6	12.36049	324.4 ± 1.4	0.44%
87	1.31294 ± 0.00079	0.10347 ± 0.00046	0.00126 ± 0.00005	0.00024 ± 0.00010	0.000128 ± 0.000026	9.19E-15	97.1	12.32366	323.5 ± 2.4	0.75%
88	0.50908 ± 0.00096	0.04126 ± 0.00020	0.00066 ± 0.00006	0.00009 ± 0.00008	0.000044 ± 0.000024	3.57E-15	97.4	12.01997	316.2 ± 4.8	1.50%
89	1.70469 ± 0.00150	0.13887 ± 0.00043	0.00157 ± 0.00006	-0.00002 ± 0.00008	0.000050 ± 0.000027	1.19E-14	99.1	12.16943	319.8 ± 1.8	0.57%
90	0.59776 ± 0.00100	0.04702 ± 0.00017	0.00054 ± 0.00006	0.00012 ± 0.00010	-0.000050 ± 0.000034	4.19E-15	102.5	12.71206	332.8 ± 5.7	1.71%
91	2.40968 ± 0.00164	0.17263 ± 0.00052	0.00208 ± 0.00008	0.00045 ± 0.00007	0.000102 ± 0.000022	1.69E-14	98.7	13.78363	358.3 ± 1.5	0.41%
92	0.70373 ± 0.00134	0.05587 ± 0.00018	0.00078 ± 0.00005	0.00019 ± 0.00012	0.000046 ± 0.000025	4.93E-15	98.1	12.35220	324.2 ± 3.7	1.15%
93	0.44430 ± 0.00088	0.03548 ± 0.00008	0.00045 ± 0.00005	0.00016 ± 0.00009	0.000048 ± 0.000026	3.11E-15	96.8	12.11969	318.6 ± 5.8	1.81%
94	0.50757 ± 0.00056	0.03966 ± 0.00018	0.00049 ± 0.00005	0.00001 ± 0.00011	0.000060 ± 0.000023	3.55E-15	96.5	12.35242	324.2 ± 4.8	1.48%
95	0.74188 ± 0.00131	0.06020 ± 0.00028	0.00065 ± 0.00006	-0.00025 ± 0.00008	-0.000020 ± 0.000022	5.20E-15	100.8	12.32248	323.5 ± 3.3	1.01%
96	0.61791 ± 0.00102	0.04904 ± 0.00017	0.00052 ± 0.00005	-0.00017 ± 0.00012	-0.000004 ± 0.000022	4.33E-15	100.2	12.59933	330.1 ± 3.7	1.12%
97	0.72767 ± 0.00172	0.04975 ± 0.00019	0.00062 ± 0.00005	0.00019 ± 0.00007	0.000069 ± 0.000022	5.10E-15	97.2	14.21954	368.5 ± 3.9	1.05%
98	0.52651 ± 0.00097	0.04313 ± 0.00022	0.00049 ± 0.00006	0.00012 ± 0.00012	-0.000039 ± 0.000034	3.69E-15	102.2	12.20634	320.7 ± 6.3	1.97%

au21.1m.mus (BRK 100) Mitchell Moore *j=0.019472±0.000018 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
Blank	0.00974 0.00018	0.00013 0.00003	0.00005 0.00001	0.00025 0.00001	0.00000 0.00002					
1	1.18710 ± 0.00095	0.09551 ± 0.00025	0.00128 ± 0.00003	0.00211 ± 0.000064	0.000051 ± 0.000014	8.31E-15	98.8	12.27396	386.6 ± 1.8	0.45%
2	0.40337 ± 0.00082	0.04066 ± 0.00019	0.00055 ± 0.00003	0.00013 ± 0.000030	0.000018 ± 0.000014	2.82E-15	98.7	9.78920	314.8 ± 3.7	1.18%
3	0.97574 ± 0.00094	0.09808 ± 0.00028	0.00128 ± 0.00003	0.00301 ± 0.000057	0.000056 ± 0.000014	6.83E-15	98.3	9.78306	314.6 ± 1.7	0.53%
4	0.19807 ± 0.00051	0.01972 ± 0.00013	0.00016 ± 0.00006	-0.00019 ± 0.000057	0.000019 ± 0.000013	1.39E-15	97.2	9.76046	313.9 ± 6.5	2.06%
5	0.62937 ± 0.00062	0.06364 ± 0.00022	0.00078 ± 0.00003	0.00036 ± 0.000039	0.000051 ± 0.000011	4.41E-15	97.6	9.65278	310.7 ± 2.0	0.65%
6	0.32982 ± 0.00089	0.02286 ± 0.00010	0.00031 ± 0.00003	0.00026 ± 0.000040	-0.000010 ± 0.000024	2.31E-15	100.9	14.42879	446.7 ± 10.1	2.25%
7	0.71262 ± 0.00077	0.07045 ± 0.00015	0.00095 ± 0.00003	-0.00002 ± 0.000042	0.000009 ± 0.000017	4.99E-15	99.6	10.07768	323.2 ± 2.4	0.76%
8	0.53599 ± 0.00088	0.05602 ± 0.00020	0.00072 ± 0.00004	0.00036 ± 0.000044	-0.000004 ± 0.000012	3.75E-15	100.2	9.56758	308.2 ± 2.3	0.75%
9	1.03461 ± 0.00117	0.08184 ± 0.00024	0.00108 ± 0.00003	0.00017 ± 0.000041	0.000037 ± 0.000014	7.25E-15	98.9	12.50923	393.3 ± 2.0	0.50%
10	0.35359 ± 0.00073	0.03012 ± 0.00012	0.00040 ± 0.00003	0.00064 ± 0.000057	-0.000015 ± 0.000021	2.48E-15	101.3	11.74252	371.5 ± 6.9	1.85%
11	0.82817 ± 0.00074	0.08361 ± 0.00043	0.00110 ± 0.00004	0.00128 ± 0.000031	-0.000018 ± 0.000016	5.80E-15	100.7	9.90685	318.2 ± 2.4	0.76%
12	0.35439 ± 0.00048	0.02664 ± 0.00013	0.00034 ± 0.00003	0.00010 ± 0.000058	0.000019 ± 0.000015	2.48E-15	98.4	13.09324	409.7 ± 5.7	1.40%
13	0.29962 ± 0.00078	0.02613 ± 0.00013	0.00031 ± 0.00003	0.00000 ± 0.000053	-0.000012 ± 0.000014	2.10E-15	101.1	11.46494	363.5 ± 5.5	1.52%
14	0.42747 ± 0.00051	0.04286 ± 0.00019	0.00056 ± 0.00004	0.00034 ± 0.000058	0.000000 ± 0.000015	2.99E-15	100.0	9.97413	320.2 ± 3.5	1.10%
15	0.23340 ± 0.00058	0.02330 ± 0.00013	0.00035 ± 0.00003	0.00059 ± 0.000044	-0.000009 ± 0.000016	1.63E-15	101.1	10.01897	321.5 ± 6.7	2.08%
16	0.80655 ± 0.00125	0.08056 ± 0.00027	0.00102 ± 0.00004	0.00014 ± 0.000031	0.000006 ± 0.000014	5.65E-15	99.8	9.99105	320.7 ± 2.1	0.64%
17	0.38861 ± 0.00049	0.03813 ± 0.00011	0.00050 ± 0.00002	0.00022 ± 0.000047	0.000033 ± 0.000012	2.72E-15	97.5	9.93455	319.0 ± 3.2	0.99%
18	0.53842 ± 0.00083	0.05281 ± 0.00013	0.00069 ± 0.00004	0.00028 ± 0.000052	0.000074 ± 0.000015	3.77E-15	96.0	9.78269	314.6 ± 2.9	0.92%
19	0.51260 ± 0.00087	0.05030 ± 0.00023	0.00069 ± 0.00002	0.00076 ± 0.000046	0.000051 ± 0.000015	3.59E-15	97.1	9.89367	317.8 ± 3.2	1.02%
20	0.47443 ± 0.00086	0.04675 ± 0.00015	0.00055 ± 0.00004	0.00016 ± 0.000035	0.000032 ± 0.000014	3.32E-15	98.0	9.94499	319.3 ± 3.1	0.97%
21	0.78288 ± 0.00102	0.07722 ± 0.00027	0.00095 ± 0.00004	0.00042 ± 0.000039	0.000056 ± 0.000015	5.48E-15	97.9	9.92400	318.7 ± 2.2	0.69%
22	0.45226 ± 0.00080	0.04477 ± 0.00013	0.00059 ± 0.00002	0.00021 ± 0.000050	0.000090 ± 0.000021	3.17E-15	94.1	9.51009	306.5 ± 4.6	1.49%
23	0.68118 ± 0.00099	0.06837 ± 0.00029	0.00088 ± 0.00004	0.00046 ± 0.000039	0.000118 ± 0.000028	4.77E-15	94.9	9.45600	304.9 ± 4.2	1.36%
24	0.59522 ± 0.00077	0.04906 ± 0.00034	0.00065 ± 0.00002	0.00049 ± 0.000031	0.000084 ± 0.000022	4.17E-15	95.8	11.62503	368.1 ± 5.0	1.35%
25	0.58277 ± 0.00126	0.05828 ± 0.00019	0.00077 ± 0.00003	0.00022 ± 0.000048	0.000010 ± 0.000027	4.08E-15	99.5	9.94763	319.4 ± 4.5	1.41%
26	0.31805 ± 0.00032	0.03146 ± 0.00015	0.00038 ± 0.00003	0.00016 ± 0.000056	0.000084 ± 0.000022	2.23E-15	92.2	9.31903	300.8 ± 6.8	2.26%
27	0.78692 ± 0.00067	0.07651 ± 0.00026	0.00096 ± 0.00003	0.00130 ± 0.000069	0.000061 ± 0.000018	5.51E-15	97.7	10.05127	322.5 ± 2.5	0.77%
28	1.25167 ± 0.00071	0.10690 ± 0.00043	0.00131 ± 0.00003	0.00069 ± 0.000041	0.000026 ± 0.000015	8.77E-15	99.4	11.63917	368.5 ± 2.0	0.54%
29	1.48493 ± 0.00173	0.14702 ± 0.00054	0.00185 ± 0.00003	0.00087 ± 0.000050	-0.000024 ± 0.000022	1.04E-14	100.5	10.10103	323.9 ± 1.9	0.59%
30	1.25293 ± 0.00194	0.12390 ± 0.00056	0.00155 ± 0.00003	0.00074 ± 0.000042	0.000032 ± 0.000015	8.77E-15	99.3	10.03657	322.0 ± 1.9	0.59%
31	1.18009 ± 0.00138	0.11656 ± 0.00039	0.00145 ± 0.00003	0.00097 ± 0.000045	0.000044 ± 0.000016	8.26E-15	98.9	10.01261	321.3 ± 1.7	0.54%
32	2.45964 ± 0.00335	0.24643 ± 0.00056	0.00319 ± 0.00005	0.00697 ± 0.000125	0.000050 ± 0.000012	1.72E-14	99.4	9.92442	318.7 ± 1.0	0.31%
33	0.83812 ± 0.00132	0.08385 ± 0.00042	0.00108 ± 0.00003	0.00085 ± 0.000021	0.000040 ± 0.000015	5.87E-15	98.6	9.85547	316.7 ± 2.4	0.77%
34	1.37660 ± 0.00129	0.13611 ± 0.00042	0.00176 ± 0.00003	0.00052 ± 0.000068	0.000056 ± 0.000014	9.64E-15	98.8	9.99329	320.8 ± 1.4	0.44%

35	0.69718 ± 0.00070	0.06046 ± 0.00042	0.00070 ± 0.00003	0.00034 ± 0.000049	0.000001 ± 0.000014	4.88E-15	100.0	11.52904	365.4 ± 3.4	0.92%
36	0.41576 ± 0.00062	0.04133 ± 0.00014	0.00054 ± 0.00003	0.00016 ± 0.000042	0.000008 ± 0.000014	2.91E-15	99.4	10.00022	321.0 ± 3.4	1.06%
37	0.71483 ± 0.00086	0.07086 ± 0.00018	0.00091 ± 0.00004	0.00063 ± 0.000053	0.000032 ± 0.000014	5.01E-15	98.7	9.95623	319.7 ± 2.0	0.64%
38	1.04181 ± 0.00170	0.10417 ± 0.00038	0.00131 ± 0.00003	0.00045 ± 0.000070	0.000035 ± 0.000015	7.30E-15	99.0	9.90320	318.1 ± 1.9	0.60%
39	0.59072 ± 0.00087	0.05135 ± 0.00021	0.00064 ± 0.00003	0.00078 ± 0.000051	0.000013 ± 0.000016	4.14E-15	99.4	11.42884	362.5 ± 3.3	0.90%
40	0.85071 ± 0.00114	0.06047 ± 0.00024	0.00081 ± 0.00003	0.00043 ± 0.000031	0.000004 ± 0.000013	5.96E-15	99.9	14.04905	436.3 ± 2.6	0.60%
41	0.48196 ± 0.00113	0.04762 ± 0.00013	0.00062 ± 0.00003	0.00046 ± 0.000038	0.000021 ± 0.000014	3.38E-15	98.7	9.99225	320.7 ± 3.1	0.97%
42	0.64992 ± 0.00080	0.06240 ± 0.00018	0.00083 ± 0.00004	0.00013 ± 0.000067	0.000109 ± 0.000013	4.55E-15	95.1	9.90047	318.0 ± 2.3	0.72%
43	0.29010 ± 0.00054	0.02826 ± 0.00012	0.00041 ± 0.00002	0.00017 ± 0.000035	0.000061 ± 0.000014	2.03E-15	93.7	9.62441	309.9 ± 4.9	1.60%
44	0.45870 ± 0.00043	0.03746 ± 0.00013	0.00052 ± 0.00003	0.00029 ± 0.000058	0.000037 ± 0.000014	3.21E-15	97.6	11.95750	377.6 ± 3.8	1.00%
45	0.36638 ± 0.00042	0.03080 ± 0.00021	0.00043 ± 0.00002	0.00017 ± 0.000050	0.000000 ± 0.000022	2.57E-15	100.0	11.89425	375.8 ± 7.1	1.88%
46	0.52189 ± 0.00098	0.04252 ± 0.00023	0.00051 ± 0.00003	0.00030 ± 0.000048	0.000032 ± 0.000014	3.65E-15	98.2	12.05408	380.4 ± 3.8	0.99%
47	0.78014 ± 0.00138	0.06708 ± 0.00013	0.00085 ± 0.00003	0.00006 ± 0.000030	0.000059 ± 0.000013	5.46E-15	97.8	11.37235	360.9 ± 2.0	0.56%
48	0.85753 ± 0.00172	0.08572 ± 0.00038	0.00110 ± 0.00004	0.00180 ± 0.000045	0.000044 ± 0.000012	6.01E-15	98.5	9.85362	316.7 ± 2.1	0.65%
49	0.29870 ± 0.00053	0.02930 ± 0.00020	0.00039 ± 0.00002	0.00178 ± 0.000038	0.000042 ± 0.000013	2.09E-15	95.9	9.77990	314.5 ± 4.7	1.50%
50	0.44406 ± 0.00046	0.04321 ± 0.00018	0.00055 ± 0.00003	0.00010 ± 0.000038	0.000052 ± 0.000013	3.11E-15	96.6	9.92190	318.7 ± 3.3	1.02%
51	0.74930 ± 0.00136	0.06293 ± 0.00019	0.00086 ± 0.00003	0.00025 ± 0.000044	0.000043 ± 0.000012	5.25E-15	98.3	11.70518	370.4 ± 2.2	0.59%
52	0.52433 ± 0.00090	0.05169 ± 0.00021	0.00067 ± 0.00004	0.00030 ± 0.000065	0.000046 ± 0.000013	3.67E-15	97.4	9.87997	317.4 ± 2.8	0.88%
53	0.16611 ± 0.00065	0.01664 ± 0.00012	0.00020 ± 0.00003	0.00014 ± 0.000057	-0.000060 ± 0.000023	1.16E-15	110.7	9.98352	320.5 ± 13.5	4.21%
54	0.39945 ± 0.00049	0.03501 ± 0.00017	0.00043 ± 0.00003	0.00030 ± 0.000035	0.000025 ± 0.000012	2.80E-15	98.2	11.20212	356.0 ± 3.8	1.05%
55	0.72436 ± 0.00078	0.07236 ± 0.00035	0.00097 ± 0.00003	0.00036 ± 0.000035	0.000042 ± 0.000011	5.07E-15	98.3	9.84088	316.3 ± 2.1	0.68%
56	0.75427 ± 0.00110	0.07400 ± 0.00024	0.00091 ± 0.00003	0.00069 ± 0.000033	0.000050 ± 0.000014	5.28E-15	98.0	9.99430	320.8 ± 2.1	0.66%
57	0.48730 ± 0.00104	0.04694 ± 0.00020	0.00064 ± 0.00003	0.00055 ± 0.000051	-0.000019 ± 0.000020	3.41E-15	101.1	10.38184	332.2 ± 4.2	1.28%
58	0.60536 ± 0.00126	0.04509 ± 0.00014	0.00055 ± 0.00003	0.00049 ± 0.000056	-0.000021 ± 0.000021	4.24E-15	101.0	13.42765	419.0 ± 4.5	1.08%
59	0.64212 ± 0.00091	0.06353 ± 0.00029	0.00083 ± 0.00003	0.00034 ± 0.000060	-0.000027 ± 0.000022	4.50E-15	101.2	10.10862	324.2 ± 3.6	1.10%
60	1.37063 ± 0.00188	0.11542 ± 0.00027	0.00143 ± 0.00005	0.00059 ± 0.000057	0.000062 ± 0.000013	9.60E-15	98.7	11.71611	370.7 ± 1.5	0.40%
61	0.54526 ± 0.00100	0.05417 ± 0.00020	0.00073 ± 0.00003	0.00105 ± 0.000044	0.000035 ± 0.000012	3.82E-15	98.1	9.87848	317.4 ± 2.4	0.77%
62	0.84987 ± 0.00113	0.08669 ± 0.00033	0.00108 ± 0.00004	0.00418 ± 0.000056	0.000027 ± 0.000013	5.95E-15	99.1	9.71518	312.6 ± 1.9	0.61%
63	0.31524 ± 0.00025	0.03132 ± 0.00009	0.00041 ± 0.00003	0.00044 ± 0.000038	0.000029 ± 0.000012	2.21E-15	97.3	9.79039	314.8 ± 3.8	1.21%
64	0.94187 ± 0.00153	0.07609 ± 0.00037	0.00101 ± 0.00004	0.00011 ± 0.000069	0.000016 ± 0.000018	6.60E-15	99.5	12.31589	387.8 ± 2.9	0.76%
65	0.44726 ± 0.00109	0.04315 ± 0.00013	0.00059 ± 0.00003	0.00020 ± 0.000046	0.000035 ± 0.000012	3.13E-15	97.7	10.12555	324.7 ± 2.9	0.89%
66	0.35022 ± 0.00031	0.02969 ± 0.00014	0.00036 ± 0.00002	0.00014 ± 0.000043	0.000030 ± 0.000013	2.45E-15	97.4	11.49387	364.4 ± 4.3	1.19%
67	0.65301 ± 0.00146	0.06118 ± 0.00040	0.00076 ± 0.00003	0.00030 ± 0.000031	0.000024 ± 0.000016	4.57E-15	98.9	10.55785	337.3 ± 3.4	1.00%
68	0.51358 ± 0.00106	0.05118 ± 0.00018	0.00065 ± 0.00003	0.00016 ± 0.000049	0.000020 ± 0.000014	3.60E-15	98.9	9.92099	318.6 ± 2.8	0.89%
69	0.51038 ± 0.00065	0.05160 ± 0.00029	0.00067 ± 0.00004	0.00024 ± 0.000078	0.000032 ± 0.000016	3.57E-15	98.2	9.70930	312.4 ± 3.5	1.12%
70	0.79448 ± 0.00107	0.06975 ± 0.00042	0.00086 ± 0.00003	0.00040 ± 0.000041	0.000014 ± 0.000014	5.56E-15	99.5	11.33360	359.8 ± 2.9	0.81%
71	0.53735 ± 0.00069	0.03622 ± 0.00017	0.00048 ± 0.00003	0.00024 ± 0.000043	-0.000042 ± 0.000020	3.76E-15	102.3	14.83449	457.8 ± 5.5	1.19%
72	0.37035 ± 0.00056	0.03697 ± 0.00013	0.00047 ± 0.00003	0.00198 ± 0.000068	0.000005 ± 0.000013	2.59E-15	99.6	9.97988	320.4 ± 3.6	1.12%
73	0.36301 ± 0.00053	0.03685 ± 0.00013	0.00047 ± 0.00005	0.00053 ± 0.000043	-0.000010 ± 0.000016	2.54E-15	100.8	9.85235	316.6 ± 4.4	1.39%

74	0.99460 ± 0.00133	0.09912 ± 0.00029	0.00129 ± 0.00004	0.00143 ± 0.000111	-0.000027 ± 0.000014	6.97E-15	100.8	10.03614	322.0 ± 1.7	0.53%
75	1.02278 ± 0.00156	0.10169 ± 0.00045	0.00132 ± 0.00003	0.00089 ± 0.000043	0.000034 ± 0.000014	7.16E-15	99.0	9.96133	319.8 ± 2.0	0.63%
76	0.67798 ± 0.00128	0.06032 ± 0.00021	0.00076 ± 0.00004	0.00026 ± 0.000050	-0.000002 ± 0.000014	4.75E-15	100.1	11.23921	357.0 ± 2.6	0.72%
77	0.28855 ± 0.00034	0.02535 ± 0.00009	0.00038 ± 0.00004	0.00040 ± 0.000040	-0.000077 ± 0.000021	2.02E-15	107.9	11.38560	361.3 ± 7.9	2.18%
78	0.17923 ± 0.00042	0.01803 ± 0.00011	0.00016 ± 0.00003	0.00003 ± 0.000061	0.000017 ± 0.000014	1.26E-15	97.3	9.67020	311.2 ± 7.5	2.41%
79	0.56109 ± 0.00109	0.05543 ± 0.00023	0.00080 ± 0.00003	0.00023 ± 0.000039	-0.000001 ± 0.000015	3.93E-15	100.1	10.12341	324.6 ± 3.0	0.92%
80	0.58608 ± 0.00116	0.05801 ± 0.00032	0.00079 ± 0.00004	0.00055 ± 0.000088	-0.000019 ± 0.000015	4.10E-15	101.0	10.10327	324.0 ± 3.0	0.94%
81	0.70109 ± 0.00157	0.07666 ± 0.00036	0.00111 ± 0.00005	0.00093 ± 0.000035	0.000038 ± 0.000016	4.91E-15	98.4	9.00138	291.4 ± 2.5	0.85%
82	0.37751 ± 0.00070	0.03066 ± 0.00015	0.00041 ± 0.00002	0.00003 ± 0.000043	0.000001 ± 0.000015	2.64E-15	99.9	12.30445	387.5 ± 5.0	1.30%
83	0.69203 ± 0.00090	0.06928 ± 0.00018	0.00083 ± 0.00004	0.00007 ± 0.000054	0.000005 ± 0.000012	4.85E-15	99.8	9.96586	320.0 ± 1.9	0.60%
84	0.88321 ± 0.00114	0.08798 ± 0.00035	0.00113 ± 0.00004	0.00035 ± 0.000028	0.000014 ± 0.000015	6.19E-15	99.5	9.99272	320.8 ± 2.1	0.65%
85	0.52913 ± 0.00087	0.05148 ± 0.00025	0.00067 ± 0.00003	0.00031 ± 0.000066	0.000005 ± 0.000016	3.71E-15	99.7	10.25130	328.3 ± 3.4	1.02%
86	0.98234 ± 0.00154	0.06571 ± 0.00014	0.00086 ± 0.00004	0.00133 ± 0.000066	-0.000040 ± 0.000021	6.88E-15	101.2	14.95209	461.0 ± 3.2	0.70%
87	0.75003 ± 0.00127	0.07509 ± 0.00028	0.00092 ± 0.00004	0.00010 ± 0.000045	0.000042 ± 0.000015	5.25E-15	98.3	9.82090	315.7 ± 2.3	0.72%
88	0.55802 ± 0.00082	0.05663 ± 0.00031	0.00067 ± 0.00003	0.00047 ± 0.000063	0.000027 ± 0.000013	3.91E-15	98.6	9.71323	312.5 ± 2.8	0.90%
89	0.32555 ± 0.00045	0.03213 ± 0.00014	0.00039 ± 0.00003	0.00015 ± 0.000033	0.000017 ± 0.000014	2.28E-15	98.5	9.98175	319.0 ± 4.3	1.34%
90	0.65294 ± 0.00112	0.05436 ± 0.00021	0.00067 ± 0.00002	0.00008 ± 0.000042	0.000007 ± 0.000014	4.57E-15	99.7	11.97485	378.1 ± 2.9	0.77%
91	0.28247 ± 0.00050	0.02499 ± 0.00009	0.00031 ± 0.00004	0.00000 ± 0.000058	-0.000020 ± 0.000013	1.98E-15	102.1	11.30204	358.9 ± 5.2	1.44%
92	0.38154 ± 0.00102	0.03173 ± 0.00010	0.00040 ± 0.00003	0.00020 ± 0.000055	0.000044 ± 0.000022	2.67E-15	96.6	11.61442	367.8 ± 6.7	1.83%
93	0.72504 ± 0.00132	0.07180 ± 0.00020	0.00095 ± 0.00003	0.00052 ± 0.000042	0.000065 ± 0.000023	5.08E-15	97.4	9.83125	316.0 ± 3.3	1.03%
94	0.67982 ± 0.00100	0.05963 ± 0.00018	0.00081 ± 0.00003	0.00104 ± 0.000040	-0.000002 ± 0.000029	4.76E-15	100.1	11.40300	361.8 ± 4.8	1.32%
95	0.61472 ± 0.00103	0.05101 ± 0.00036	0.00063 ± 0.00003	0.00070 ± 0.000048	0.000075 ± 0.000023	4.31E-15	96.4	11.61834	367.9 ± 5.1	1.38%
96	0.48880 ± 0.00085	0.04833 ± 0.00015	0.00062 ± 0.00003	0.00072 ± 0.000038	0.000009 ± 0.000030	3.42E-15	99.4	10.05746	322.7 ± 6.0	1.84%
97	0.42174 ± 0.00063	0.04246 ± 0.00024	0.00047 ± 0.00002	0.00019 ± 0.000050	0.000022 ± 0.000031	2.95E-15	98.5	9.78394	314.6 ± 7.2	2.28%
98	0.38733 ± 0.00042	0.03830 ± 0.00015	0.00048 ± 0.00003	0.00007 ± 0.000035	0.000044 ± 0.000024	2.71E-15	96.6	9.77351	314.3 ± 6.2	1.96%
99	0.55752 ± 0.00089	0.05626 ± 0.00030	0.00067 ± 0.00003	0.00004 ± 0.000037	0.000016 ± 0.000027	3.90E-15	99.2	9.82704	315.9 ± 4.8	1.53%
100	0.43373 ± 0.00066	0.04299 ± 0.00018	0.00057 ± 0.00003	0.00049 ± 0.000049	0.000055 ± 0.000024	3.04E-15	96.3	9.71492	312.6 ± 5.6	1.78%
101	0.39155 ± 0.00081	0.03902 ± 0.00017	0.00052 ± 0.00002	0.00078 ± 0.000035	0.000042 ± 0.000024	2.74E-15	96.9	9.71989	312.7 ± 6.1	1.95%
102	0.39711 ± 0.00063	0.03967 ± 0.00016	0.00058 ± 0.00003	0.00019 ± 0.000047	0.000022 ± 0.000015	2.78E-15	98.4	9.84946	316.5 ± 3.8	1.21%
103	0.55117 ± 0.00111	0.05472 ± 0.00016	0.00073 ± 0.00003	0.00070 ± 0.000072	-0.000060 ± 0.000023	3.86E-15	103.2	10.07437	323.2 ± 4.2	1.30%
104	0.46750 ± 0.00122	0.03429 ± 0.00009	0.00045 ± 0.00003	0.00045 ± 0.000039	0.000042 ± 0.000015	3.27E-15	97.4	13.27596	414.8 ± 4.3	1.03%
105	1.09568 ± 0.00164	0.10695 ± 0.00032	0.00140 ± 0.00003	0.00061 ± 0.000048	0.000031 ± 0.000014	7.67E-15	99.2	10.15916	325.6 ± 1.7	0.52%
106	0.31221 ± 0.00058	0.03121 ± 0.00010	0.00044 ± 0.00002	0.00010 ± 0.000057	0.000012 ± 0.000018	2.19E-15	98.9	9.89565	317.9 ± 5.6	1.77%
107	0.52088 ± 0.00060	0.05172 ± 0.00013	0.00067 ± 0.00002	0.00031 ± 0.000034	0.000018 ± 0.000015	3.65E-15	99.0	9.96874	320.0 ± 2.8	0.89%
108	0.22084 ± 0.00070	0.02133 ± 0.00019	0.00035 ± 0.00003	0.00049 ± 0.000044	0.000020 ± 0.000028	1.55E-15	97.4	10.08206	323.4 ± 12.7	3.94%
109	0.20706 ± 0.00076	0.02050 ± 0.00014	0.00033 ± 0.00003	0.00024 ± 0.000050	-0.000035 ± 0.000023	1.45E-15	105.0	10.10341	324.0 ± 11.0	3.40%
110	0.20696 ± 0.00065	0.02042 ± 0.00014	0.00030 ± 0.00003	0.00019 ± 0.000051	0.000026 ± 0.000024	1.45E-15	96.3	9.76120	313.9 ± 11.5	3.67%
111	0.33520 ± 0.00102	0.03354 ± 0.00012	0.00044 ± 0.00003	0.00091 ± 0.000063	0.000032 ± 0.000016	2.35E-15	97.2	9.71252	312.5 ± 4.8	1.52%
112	0.29667 ± 0.00066	0.02960 ± 0.00009	0.00040 ± 0.00003	0.00036 ± 0.000040	0.000044 ± 0.000016	2.08E-15	95.6	9.58773	308.8 ± 5.3	1.70%

au21.1l.mus (BRK 354) Mitchell Moore *j=0.019472±0.000018 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
1	1.88365 ± 0.00139	0.15324 ± 0.00079	0.00201 ± 0.00005	0.00114 ± 0.000102	0.000103 ± 0.000012	1.32E-14	98.4	12.09493	381.5 ± 2.1	0.56%
2	1.01042 ± 0.00334	0.09973 ± 0.00060	0.00129 ± 0.00003	0.00063 ± 0.000091	0.000018 ± 0.000014	7.08E-15	99.5	10.07988	323.3 ± 2.6	0.80%
3	1.63275 ± 0.00361	0.16369 ± 0.00054	0.00219 ± 0.00005	0.00363 ± 0.000065	0.000056 ± 0.000012	1.14E-14	99.0	9.87601	317.3 ± 1.5	0.46%
4	0.46833 ± 0.00137	0.04689 ± 0.00045	0.00059 ± 0.00002	0.00019 ± 0.000054	0.000002 ± 0.000010	3.28E-15	99.9	9.97680	320.3 ± 3.8	1.19%
5	1.85061 ± 0.00131	0.15614 ± 0.00042	0.00206 ± 0.00004	0.00047 ± 0.000052	0.000011 ± 0.000013	1.30E-14	99.8	11.83234	374.1 ± 1.3	0.34%
6	0.48939 ± 0.00059	0.04858 ± 0.00019	0.00065 ± 0.00003	0.00007 ± 0.000041	0.000017 ± 0.000012	3.43E-15	99.0	9.96801	320.0 ± 2.7	0.84%
7	1.60776 ± 0.00245	0.15934 ± 0.00053	0.00213 ± 0.00004	0.00148 ± 0.000061	0.000029 ± 0.000024	1.13E-14	99.5	10.03782	322.1 ± 1.9	0.58%
8	0.43297 ± 0.00087	0.04299 ± 0.00033	0.00061 ± 0.00003	0.00164 ± 0.000084	0.000067 ± 0.000019	3.03E-15	95.4	9.61185	309.5 ± 4.9	1.57%
9	1.12681 ± 0.00136	0.11005 ± 0.00064	0.00142 ± 0.00003	0.00018 ± 0.000057	0.000116 ± 0.000019	7.89E-15	97.0	9.92758	318.8 ± 2.6	0.80%
10	2.77989 ± 0.00411	0.18588 ± 0.00059	0.00239 ± 0.00005	0.00045 ± 0.000047	0.000054 ± 0.000018	1.95E-14	99.4	14.86918	458.7 ± 1.8	0.40%
11	1.20826 ± 0.00354	0.10270 ± 0.00046	0.00136 ± 0.00004	0.00013 ± 0.000032	0.000045 ± 0.000018	8.46E-15	98.9	11.63568	368.4 ± 2.6	0.71%
12	0.91024 ± 0.00147	0.09070 ± 0.00022	0.00114 ± 0.00004	0.00004 ± 0.000049	-0.000006 ± 0.000018	6.37E-15	100.2	10.03590	322.0 ± 2.1	0.66%
13	1.58348 ± 0.00163	0.16029 ± 0.00045	0.00209 ± 0.00003	0.00023 ± 0.000047	0.000028 ± 0.000012	1.11E-14	99.5	9.82657	315.9 ± 1.2	0.38%
14	0.99056 ± 0.00114	0.09867 ± 0.00026	0.00136 ± 0.00004	0.00025 ± 0.000074	0.000021 ± 0.000010	6.94E-15	99.4	9.97526	320.2 ± 1.4	0.43%
15	2.02266 ± 0.00179	0.20134 ± 0.00071	0.00253 ± 0.00003	0.00092 ± 0.000060	0.000039 ± 0.000012	1.42E-14	99.4	9.98944	320.7 ± 1.3	0.40%
16	0.51652 ± 0.00097	0.05074 ± 0.00019	0.00068 ± 0.00003	0.00018 ± 0.000045	0.000009 ± 0.000012	3.62E-15	99.5	10.12436	324.6 ± 2.6	0.79%
17	2.79103 ± 0.00360	0.23688 ± 0.00060	0.00301 ± 0.00005	0.00147 ± 0.000031	0.000042 ± 0.000024	1.95E-14	99.6	11.73078	371.2 ± 1.4	0.38%
18	4.47966 ± 0.00455	0.44674 ± 0.00153	0.00569 ± 0.00006	0.00573 ± 0.000096	0.000061 ± 0.000017	3.14E-14	99.6	9.98805	320.6 ± 1.2	0.38%
19	1.15427 ± 0.00215	0.11507 ± 0.00039	0.00151 ± 0.00004	0.00025 ± 0.000059	0.000039 ± 0.000016	8.08E-15	99.0	9.93041	318.9 ± 1.8	0.57%
20	2.68592 ± 0.00459	0.26030 ± 0.00048	0.00338 ± 0.00005	0.00192 ± 0.000094	0.000106 ± 0.000020	1.88E-14	98.8	10.19875	326.8 ± 1.1	0.34%
21	3.42285 ± 0.00388	0.34358 ± 0.00057	0.00439 ± 0.00005	0.00108 ± 0.000043	0.000082 ± 0.000016	2.40E-14	99.3	9.89240	317.8 ± 0.8	0.25%
22	1.04544 ± 0.00130	0.10458 ± 0.00033	0.00133 ± 0.00004	0.00019 ± 0.000059	-0.000033 ± 0.000023	7.32E-15	100.9	9.99633	320.9 ± 2.3	0.73%
23	0.61747 ± 0.00106	0.06114 ± 0.00024	0.00081 ± 0.00002	0.00090 ± 0.000071	0.000018 ± 0.000011	4.32E-15	99.2	10.01394	321.4 ± 2.3	0.70%
24	1.49357 ± 0.00211	0.12707 ± 0.00044	0.00158 ± 0.00004	0.00066 ± 0.000072	0.000034 ± 0.000012	1.05E-14	99.3	11.67470	369.5 ± 1.7	0.45%
25	2.06682 ± 0.00153	0.20734 ± 0.00051	0.00269 ± 0.00003	0.00048 ± 0.000044	0.000045 ± 0.000013	1.45E-14	99.4	9.90413	318.1 ± 1.0	0.32%
26	2.33069 ± 0.00320	0.23170 ± 0.00064	0.00300 ± 0.00004	0.00105 ± 0.000072	0.000014 ± 0.000013	1.63E-14	99.8	10.04221	322.2 ± 1.1	0.35%
27	0.95234 ± 0.00074	0.09370 ± 0.00041	0.00127 ± 0.00004	0.00007 ± 0.000057	0.000061 ± 0.000014	6.67E-15	98.1	9.97264	320.2 ± 2.0	0.63%
28	1.78256 ± 0.00107	0.17657 ± 0.00046	0.00238 ± 0.00005	0.00021 ± 0.000041	0.000033 ± 0.000013	1.25E-14	99.4	10.04003	322.1 ± 1.1	0.34%
29	1.67675 ± 0.00329	0.14220 ± 0.00037	0.00191 ± 0.00003	0.00066 ± 0.000063	-0.000016 ± 0.000020	1.17E-14	100.3	11.79208	372.9 ± 1.8	0.47%
30	0.86001 ± 0.00125	0.08646 ± 0.00020	0.00123 ± 0.00004	0.00013 ± 0.000045	0.000020 ± 0.000013	6.02E-15	99.3	9.87839	317.4 ± 1.7	0.54%
31	1.46731 ± 0.00175	0.14683 ± 0.00042	0.00199 ± 0.00004	0.00012 ± 0.000086	0.000014 ± 0.000013	1.03E-14	99.7	9.96529	319.9 ± 1.3	0.41%
32	1.38720 ± 0.00132	0.13735 ± 0.00059	0.00177 ± 0.00004	0.00113 ± 0.000033	0.000048 ± 0.000014	9.71E-15	99.0	9.99679	320.9 ± 1.7	0.54%
33	1.44083 ± 0.00162	0.14502 ± 0.00049	0.00199 ± 0.00007	0.00077 ± 0.000046	0.000027 ± 0.000012	1.01E-14	99.4	9.88024	317.4 ± 1.4	0.44%
34	2.36299 ± 0.00246	0.19390 ± 0.00075	0.00250 ± 0.00004	0.00036 ± 0.000055	0.000051 ± 0.000013	1.65E-14	99.4	12.10916	381.9 ± 1.7	0.44%
35	1.13124 ± 0.00136	0.09665 ± 0.00027	0.00123 ± 0.00002	0.00025 ± 0.000059	0.000027 ± 0.000013	7.92E-15	99.3	11.62121	368.0 ± 1.7	0.47%

36	0.38704 ± 0.00058	0.03884 ± 0.00018	0.00046 ± 0.00002	0.00010 ± 0.000043	0.000003 ± 0.000013	2.71E-15	99.8	9.94689	319.4 ± 3.5	1.11%
37	1.48928 ± 0.00122	0.14788 ± 0.00037	0.00183 ± 0.00004	0.00066 ± 0.000045	-0.000027 ± 0.000021	1.04E-14	100.5	10.07119	323.1 ± 1.6	0.49%
38	0.94031 ± 0.00150	0.09328 ± 0.00028	0.00120 ± 0.00002	-0.00006 ± 0.000059	-0.000040 ± 0.000020	6.59E-15	101.2	10.08053	323.3 ± 2.4	0.73%
39	1.21452 ± 0.00116	0.09914 ± 0.00031	0.00131 ± 0.00005	0.00014 ± 0.000044	-0.000046 ± 0.000020	8.51E-15	101.1	12.25006	385.9 ± 2.3	0.59%
40	0.69581 ± 0.00083	0.07007 ± 0.00036	0.00083 ± 0.00004	0.00036 ± 0.000054	-0.000011 ± 0.000022	4.87E-15	100.5	9.93010	318.9 ± 3.4	1.06%
41	2.36759 ± 0.00246	0.23600 ± 0.00059	0.00297 ± 0.00003	0.00190 ± 0.000157	-0.000004 ± 0.000021	1.66E-14	100.1	10.03272	321.9 ± 1.2	0.37%
42	0.53429 ± 0.00096	0.05359 ± 0.00037	0.00071 ± 0.00003	0.00000 ± 0.000063	-0.000002 ± 0.000012	3.74E-15	100.1	9.96957	320.1 ± 3.1	0.97%
43	2.40643 ± 0.00229	0.23990 ± 0.00033	0.00309 ± 0.00005	0.00021 ± 0.000050	0.000043 ± 0.000012	1.69E-14	99.5	9.97803	320.3 ± 0.7	0.22%
44	1.10494 ± 0.00140	0.10961 ± 0.00030	0.00142 ± 0.00004	0.00011 ± 0.000033	-0.000058 ± 0.000019	7.74E-15	101.6	10.08046	323.3 ± 1.9	0.58%
45	1.79179 ± 0.00183	0.17967 ± 0.00037	0.00224 ± 0.00004	-0.00012 ± 0.000125	0.000009 ± 0.000011	1.25E-14	99.9	9.95766	319.7 ± 0.9	0.29%
46	1.30242 ± 0.00204	0.13136 ± 0.00055	0.00173 ± 0.00005	0.00014 ± 0.000063	-0.000015 ± 0.000013	9.12E-15	100.3	9.91473	318.5 ± 1.7	0.53%
47	2.05167 ± 0.00235	0.20407 ± 0.00063	0.00269 ± 0.00004	0.00023 ± 0.000077	0.000029 ± 0.000012	1.44E-14	99.6	10.01228	321.3 ± 1.2	0.37%
48	1.71042 ± 0.00243	0.14131 ± 0.00031	0.00185 ± 0.00003	0.00085 ± 0.000048	0.000103 ± 0.000010	1.20E-14	98.2	11.89006	375.7 ± 1.2	0.32%
49	3.06333 ± 0.00354	0.30812 ± 0.00122	0.00399 ± 0.00005	0.00067 ± 0.000087	0.000043 ± 0.000012	2.15E-14	99.6	9.90098	318.1 ± 1.4	0.43%
50	0.43296 ± 0.00115	0.04256 ± 0.00021	0.00051 ± 0.00003	0.00017 ± 0.000067	0.000033 ± 0.000013	3.03E-15	97.7	9.94307	319.3 ± 3.5	1.09%
51	1.29037 ± 0.00135	0.12966 ± 0.00063	0.00179 ± 0.00006	0.00014 ± 0.000049	0.000030 ± 0.000011	9.04E-15	99.3	9.88280	317.5 ± 1.8	0.56%
52	2.05965 ± 0.00160	0.20490 ± 0.00045	0.00269 ± 0.00003	0.00027 ± 0.000054	0.000002 ± 0.000013	1.44E-14	100.0	10.04853	322.4 ± 0.9	0.29%
53	1.41185 ± 0.00182	0.12098 ± 0.00057	0.00151 ± 0.00004	0.00012 ± 0.000044	-0.000011 ± 0.000014	9.89E-15	100.2	11.67025	369.4 ± 2.1	0.56%
54	1.77655 ± 0.00160	0.17876 ± 0.00045	0.00228 ± 0.00002	0.00014 ± 0.000052	0.000013 ± 0.000013	1.24E-14	99.8	9.91691	318.5 ± 1.1	0.34%
55	2.21758 ± 0.00121	0.21099 ± 0.00546	0.00278 ± 0.00003	0.00067 ± 0.000077	0.000043 ± 0.000013	1.55E-14	99.4	10.44978	334.1 ± 8.7	2.61%
56	1.64771 ± 0.00155	0.13298 ± 0.00055	0.00169 ± 0.00003	0.00025 ± 0.000061	-0.000003 ± 0.000013	1.15E-14	100.1	12.39085	389.9 ± 1.9	0.49%
57	2.03259 ± 0.00152	0.20409 ± 0.00060	0.00263 ± 0.00004	0.00043 ± 0.000047	0.000007 ± 0.000013	1.42E-14	99.9	9.95019	319.5 ± 1.1	0.35%
58	1.34072 ± 0.00193	0.13430 ± 0.00037	0.00171 ± 0.00004	0.00262 ± 0.000093	0.000000 ± 0.000013	9.39E-15	100.0	9.98516	320.5 ± 1.3	0.42%
59	0.83031 ± 0.00158	0.07531 ± 0.00037	0.00098 ± 0.00004	0.00018 ± 0.000045	-0.000014 ± 0.000014	5.81E-15	100.5	11.02582	350.9 ± 2.6	0.74%
60	2.19677 ± 0.00291	0.21937 ± 0.00069	0.00281 ± 0.00004	0.00016 ± 0.000043	0.000003 ± 0.000012	1.54E-14	100.0	10.00951	321.2 ± 1.2	0.38%
61	1.80975 ± 0.00290	0.18062 ± 0.00030	0.00238 ± 0.00005	0.00057 ± 0.000075	0.000015 ± 0.000010	1.27E-14	99.8	9.99531	320.8 ± 0.9	0.29%
62	1.69705 ± 0.00240	0.16899 ± 0.00047	0.00217 ± 0.00003	0.00043 ± 0.000058	0.000005 ± 0.000012	1.19E-14	99.9	10.03304	321.9 ± 1.2	0.38%
63	1.58056 ± 0.00137	0.12858 ± 0.00039	0.00162 ± 0.00002	0.00031 ± 0.000077	0.000014 ± 0.000011	1.11E-14	99.7	12.26028	386.2 ± 1.5	0.38%
64	1.87394 ± 0.00208	0.18803 ± 0.00060	0.00242 ± 0.00004	0.00018 ± 0.000065	0.000023 ± 0.000013	1.31E-14	99.6	9.92923	318.9 ± 1.3	0.39%
65	0.83440 ± 0.00239	0.08426 ± 0.00022	0.00113 ± 0.00004	0.00010 ± 0.000055	0.000015 ± 0.000011	5.84E-15	99.5	9.85103	316.6 ± 1.8	0.56%
66	1.88491 ± 0.00239	0.18876 ± 0.00053	0.00237 ± 0.00004	0.00023 ± 0.000046	0.000000 ± 0.000013	1.32E-14	100.0	9.98523	320.5 ± 1.2	0.37%
67	2.17597 ± 0.01016	0.21798 ± 0.00089	0.00279 ± 0.00004	0.00009 ± 0.000043	0.000007 ± 0.000013	1.52E-14	99.9	9.97249	320.2 ± 2.1	0.65%
68	1.50597 ± 0.00181	0.15122 ± 0.00028	0.00198 ± 0.00003	0.00009 ± 0.000065	0.000009 ± 0.000011	1.05E-14	99.8	9.94032	319.2 ± 1.0	0.32%
69	2.32469 ± 0.00327	0.22908 ± 0.00069	0.00290 ± 0.00003	0.00041 ± 0.000059	0.000052 ± 0.000013	1.63E-14	99.3	10.08114	323.4 ± 1.2	0.37%
70	0.97248 ± 0.00141	0.09835 ± 0.00046	0.00131 ± 0.00003	-0.00004 ± 0.000054	0.000001 ± 0.000013	6.81E-15	100.0	9.88369	317.5 ± 2.0	0.63%
71	4.02381 ± 0.00326	0.40420 ± 0.00069	0.00513 ± 0.00007	0.00029 ± 0.000037	0.000034 ± 0.000014	2.82E-14	99.8	9.93041	318.9 ± 0.7	0.22%
72	0.38259 ± 0.00070	0.03716 ± 0.00019	0.00044 ± 0.00002	0.00003 ± 0.000040	-0.000020 ± 0.000019	2.68E-15	101.6	10.29546	329.6 ± 5.1	1.55%
73	0.81882 ± 0.00162	0.08260 ± 0.00035	0.00102 ± 0.00003	0.00033 ± 0.000092	-0.000011 ± 0.000022	5.73E-15	100.4	9.91316	318.4 ± 3.0	0.93%
74	0.83808 ± 0.00103	0.06940 ± 0.00018	0.00087 ± 0.00002	0.00017 ± 0.000052	0.000041 ± 0.000013	5.87E-15	98.6	11.90139	376.0 ± 2.1	0.55%

75	1.26403 ± 0.00114	0.09513 ± 0.00028	0.00125 ± 0.00004	0.00009 ± 0.000045	0.000010 ± 0.000013	8.85E-15	99.8	13.25697	414.3 ± 1.8	0.44%
76	3.27799 ± 0.00484	0.32678 ± 0.00085	0.00392 ± 0.00009	0.00011 ± 0.000064	0.000050 ± 0.000014	2.30E-14	99.6	9.98645	320.6 ± 1.0	0.33%
77	1.41106 ± 0.00191	0.14132 ± 0.00039	0.00180 ± 0.00003	0.00016 ± 0.000053	0.000026 ± 0.000013	9.88E-15	99.4	9.92974	318.9 ± 1.3	0.42%
78	3.99221 ± 0.00458	0.33940 ± 0.00046	0.00433 ± 0.00004	0.00033 ± 0.000066	-0.000017 ± 0.000021	2.80E-14	100.1	11.76276	372.1 ± 0.9	0.24%
79	2.32750 ± 0.00362	0.19938 ± 0.00087	0.00254 ± 0.00006	0.00027 ± 0.000062	0.000066 ± 0.000014	1.63E-14	99.2	11.57513	366.7 ± 1.8	0.50%
80	3.85862 ± 0.00450	0.38641 ± 0.00043	0.00510 ± 0.00005	0.00041 ± 0.000050	0.000064 ± 0.000014	2.70E-14	99.5	9.93681	319.1 ± 0.6	0.20%
81	3.36104 ± 0.00318	0.28394 ± 0.00092	0.00369 ± 0.00003	0.00022 ± 0.000073	0.000183 ± 0.000013	2.35E-14	98.4	11.64724	368.8 ± 1.3	0.37%
82	1.46481 ± 0.00206	0.14677 ± 0.00044	0.00183 ± 0.00003	0.00021 ± 0.000058	0.000007 ± 0.000012	1.03E-14	99.9	9.96580	320.0 ± 1.3	0.41%
83	1.62951 ± 0.00212	0.16276 ± 0.00063	0.00221 ± 0.00005	0.00034 ± 0.000065	0.000011 ± 0.000013	1.14E-14	99.8	9.99200	320.7 ± 1.5	0.48%
84	1.87844 ± 0.00203	0.18781 ± 0.00026	0.00233 ± 0.00004	0.00026 ± 0.000116	0.000014 ± 0.000014	1.32E-14	99.8	9.97978	320.4 ± 0.9	0.28%
85	1.39466 ± 0.00189	0.14041 ± 0.00062	0.00181 ± 0.00003	0.00051 ± 0.000069	-0.000055 ± 0.000021	9.77E-15	101.2	9.93347	319.0 ± 2.1	0.65%
86	1.61335 ± 0.00483	0.13943 ± 0.00078	0.00173 ± 0.00003	0.00094 ± 0.000083	0.000032 ± 0.000015	1.13E-14	99.4	11.50335	364.6 ± 2.5	0.69%
87	1.34843 ± 0.00209	0.13509 ± 0.00032	0.00170 ± 0.00002	0.00015 ± 0.000068	0.000058 ± 0.000012	9.44E-15	98.7	9.85548	316.7 ± 1.2	0.39%
88	0.89023 ± 0.00168	0.08984 ± 0.00031	0.00109 ± 0.00003	0.00011 ± 0.000046	0.000014 ± 0.000013	6.23E-15	99.5	9.86351	316.9 ± 1.8	0.58%
89	1.09372 ± 0.00135	0.10955 ± 0.00047	0.00133 ± 0.00004	0.00003 ± 0.000059	0.000026 ± 0.000012	7.66E-15	99.3	9.91379	318.4 ± 1.8	0.56%
90	1.37200 ± 0.00210	0.11645 ± 0.00040	0.00143 ± 0.00003	0.00081 ± 0.000050	0.000062 ± 0.000011	9.61E-15	98.7	11.62504	368.1 ± 1.7	0.45%
91	1.11069 ± 0.00129	0.11184 ± 0.00044	0.00145 ± 0.00003	0.00039 ± 0.000046	0.000013 ± 0.000013	7.78E-15	99.7	9.89666	317.9 ± 1.7	0.53%
92	0.47694 ± 0.00101	0.04844 ± 0.00027	0.00064 ± 0.00003	0.00035 ± 0.000078	0.000002 ± 0.000013	3.34E-15	99.9	9.83672	316.2 ± 3.2	1.02%
93	0.53784 ± 0.00097	0.05367 ± 0.00019	0.00065 ± 0.00002	0.00033 ± 0.000059	-0.000012 ± 0.000013	3.77E-15	100.7	10.02169	321.6 ± 2.6	0.80%
94	1.80421 ± 0.00168	0.17907 ± 0.00034	0.00230 ± 0.00003	0.00035 ± 0.000053	-0.000020 ± 0.000024	1.26E-14	100.3	10.07561	323.2 ± 1.5	0.45%
95	0.15755 ± 0.00032	0.01601 ± 0.00010	0.00018 ± 0.00002	0.00016 ± 0.000089	-0.000022 ± 0.000017	1.10E-15	104.1	9.84309	316.3 ± 10.3	3.26%
96	1.29826 ± 0.00227	0.10119 ± 0.00032	0.00133 ± 0.00003	0.00094 ± 0.000093	0.000027 ± 0.000012	9.09E-15	99.4	12.75347	400.2 ± 1.8	0.46%
97	0.82291 ± 0.00245	0.08263 ± 0.00026	0.00106 ± 0.00002	-0.00002 ± 0.000069	0.000023 ± 0.000011	5.76E-15	99.2	9.87524	317.3 ± 1.9	0.60%
98	1.19694 ± 0.00202	0.11919 ± 0.00046	0.00157 ± 0.00003	0.00020 ± 0.000051	0.000039 ± 0.000013	8.38E-15	99.0	9.94470	319.3 ± 1.7	0.53%
99	0.74972 ± 0.00118	0.07394 ± 0.00021	0.00094 ± 0.00003	0.00014 ± 0.000053	0.000002 ± 0.000011	5.25E-15	99.9	10.13018	324.8 ± 1.8	0.55%
100	2.68378 ± 0.01822	0.27083 ± 0.00159	0.00340 ± 0.00003	0.00031 ± 0.000047	0.000029 ± 0.000010	1.88E-14	99.7	9.87801	317.4 ± 2.9	0.91%
101	1.42942 ± 0.00183	0.11731 ± 0.00064	0.00156 ± 0.00003	0.00016 ± 0.000042	0.000043 ± 0.000014	1.00E-14	99.1	12.07582	381.0 ± 2.4	0.63%
102	1.13757 ± 0.00193	0.11264 ± 0.00026	0.00146 ± 0.00003	0.00012 ± 0.000050	0.000005 ± 0.000013	7.97E-15	99.9	10.08638	323.5 ± 1.4	0.44%
103	1.46946 ± 0.00119	0.14724 ± 0.00056	0.00191 ± 0.00004	0.00002 ± 0.000049	0.000011 ± 0.000012	1.03E-14	99.8	9.95718	319.7 ± 1.5	0.46%
104	1.14908 ± 0.00219	0.11653 ± 0.00041	0.00161 ± 0.00004	0.00018 ± 0.000063	0.000023 ± 0.000011	8.05E-15	99.4	9.80294	315.2 ± 1.5	0.49%
105	0.57647 ± 0.00085	0.05757 ± 0.00021	0.00080 ± 0.00002	0.00001 ± 0.000057	0.000002 ± 0.000012	4.04E-15	99.9	10.00509	321.1 ± 2.3	0.72%
106	0.60904 ± 0.00077	0.04892 ± 0.00013	0.00065 ± 0.00003	0.00074 ± 0.000071	0.000005 ± 0.000012	4.27E-15	99.8	12.42018	390.8 ± 2.5	0.63%
107	1.07061 ± 0.00145	0.10493 ± 0.00036	0.00137 ± 0.00003	0.00029 ± 0.000067	0.000024 ± 0.000012	7.50E-15	99.3	10.13539	324.9 ± 1.6	0.50%
108	1.57784 ± 0.00161	0.15773 ± 0.00039	0.00199 ± 0.00003	0.00062 ± 0.000095	0.000021 ± 0.000010	1.11E-14	99.6	9.96475	319.9 ± 1.1	0.33%
109	1.29216 ± 0.00220	0.12993 ± 0.00049	0.00167 ± 0.00003	0.00011 ± 0.000063	0.000009 ± 0.000011	9.05E-15	99.8	9.92561	318.8 ± 1.5	0.48%
110	0.89220 ± 0.00097	0.08840 ± 0.00031	0.00112 ± 0.00003	0.00026 ± 0.000062	0.000018 ± 0.000009	6.25E-15	99.4	10.03226	321.9 ± 1.5	0.48%
111	1.16546 ± 0.00194	0.09894 ± 0.00028	0.00126 ± 0.00004	0.00032 ± 0.000082	0.000011 ± 0.000009	8.16E-15	99.7	11.74682	371.6 ± 1.5	0.40%

au21.1b.mus (BRK 698) Mitchell Moore *j=0.019472±0.000018 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
1	4.17579 ± 0.00314	0.41959 ± 0.00129	0.00540 ± 0.00006	0.00000 ± 0.000074	0.000094 ± 0.000012	2.92E-14	99.3	9.88591	317.6 ± 1.0	0.33%
2	4.25866 ± 0.00356	0.42378 ± 0.00053	0.00559 ± 0.00006	0.00005 ± 0.000038	0.000017 ± 0.000014	2.98E-14	99.9	10.03732	322.1 ± 0.6	0.18%
3	4.89428 ± 0.00287	0.43743 ± 0.00072	0.00581 ± 0.00007	0.00076 ± 0.000039	0.000075 ± 0.000012	3.43E-14	99.5	11.13830	354.1 ± 0.7	0.19%
4	7.37932 ± 0.00879	0.52391 ± 0.00119	0.00688 ± 0.00009	0.00039 ± 0.000078	0.000078 ± 0.000013	5.17E-14	99.7	14.04107	436.0 ± 1.1	0.26%
5	9.90975 ± 0.00587	0.66940 ± 0.00145	0.00902 ± 0.00012	0.00080 ± 0.000074	0.001113 ± 0.000023	6.94E-14	96.7	14.31288	443.5 ± 1.1	0.24%
6	7.02617 ± 0.00610	0.49332 ± 0.00115	0.00636 ± 0.00007	0.00020 ± 0.000040	0.000030 ± 0.000011	4.92E-14	99.9	14.22506	441.1 ± 1.1	0.25%
7	3.36230 ± 0.00332	0.23926 ± 0.00036	0.00307 ± 0.00005	0.00004 ± 0.000047	0.000054 ± 0.000013	2.35E-14	99.5	13.98561	434.5 ± 0.9	0.21%
8	1.48919 ± 0.00226	0.13239 ± 0.00025	0.00170 ± 0.00003	-0.00011 ± 0.000046	0.000011 ± 0.000013	1.04E-14	99.8	11.22317	356.6 ± 1.2	0.35%
9	3.04381 ± 0.00357	0.21251 ± 0.00069	0.00271 ± 0.00005	0.00014 ± 0.000041	0.000042 ± 0.000012	2.13E-14	99.6	14.26443	442.2 ± 1.6	0.37%
10	1.13036 ± 0.00176	0.09630 ± 0.00035	0.00128 ± 0.00005	0.00022 ± 0.000046	0.000092 ± 0.000013	7.92E-15	97.6	11.45627	363.3 ± 1.9	0.54%
11	1.52407 ± 0.00216	0.13461 ± 0.00026	0.00175 ± 0.00004	-0.00003 ± 0.000054	0.000020 ± 0.000014	1.07E-14	99.6	11.27865	358.2 ± 1.3	0.36%
12	1.27262 ± 0.00219	0.12864 ± 0.00034	0.00172 ± 0.00003	-0.00008 ± 0.000060	0.000018 ± 0.000012	8.91E-15	99.6	9.85112	316.6 ± 1.3	0.42%
13	1.51775 ± 0.00115	0.15293 ± 0.00025	0.00193 ± 0.00003	-0.00011 ± 0.000045	0.000047 ± 0.000013	1.06E-14	99.1	9.83431	316.1 ± 1.0	0.31%
14	2.70592 ± 0.00391	0.24604 ± 0.00035	0.00315 ± 0.00003	0.00031 ± 0.000085	0.000048 ± 0.000013	1.90E-14	99.5	10.94021	348.4 ± 0.9	0.25%
15	1.86467 ± 0.00160	0.13192 ± 0.00063	0.00168 ± 0.00003	0.00002 ± 0.000050	0.000020 ± 0.000013	1.31E-14	99.7	14.09044	437.4 ± 2.3	0.53%
16	1.13906 ± 0.00162	0.07910 ± 0.00021	0.00091 ± 0.00005	0.00012 ± 0.000057	0.000029 ± 0.000012	7.98E-15	99.3	14.29379	443.0 ± 1.9	0.43%
17	1.96104 ± 0.00338	0.19657 ± 0.00087	0.00256 ± 0.00006	0.00006 ± 0.000034	0.000006 ± 0.000012	1.37E-14	99.9	9.96701	320.0 ± 1.6	0.51%
18	3.59433 ± 0.00247	0.30834 ± 0.00072	0.00396 ± 0.00005	-0.00005 ± 0.000050	0.000048 ± 0.000015	2.52E-14	99.6	11.61147	367.7 ± 1.0	0.27%
19	2.35593 ± 0.00442	0.16549 ± 0.00046	0.00212 ± 0.00003	0.00023 ± 0.000036	0.000014 ± 0.000013	1.65E-14	99.8	14.21165	440.7 ± 1.6	0.37%
20	2.19477 ± 0.00208	0.17680 ± 0.00057	0.00224 ± 0.00004	0.00020 ± 0.000053	0.000022 ± 0.000014	1.54E-14	99.7	12.37697	389.5 ± 1.5	0.38%
21	2.98701 ± 0.00317	0.21016 ± 0.00092	0.00271 ± 0.00006	0.00131 ± 0.000071	0.000026 ± 0.000013	2.09E-14	99.7	14.17655	439.8 ± 2.1	0.47%
22	1.04043 ± 0.00166	0.07958 ± 0.00027	0.00104 ± 0.00004	0.00005 ± 0.000064	-0.000024 ± 0.000011	7.29E-15	100.7	13.07422	409.2 ± 2.0	0.49%
23	1.57339 ± 0.00221	0.11098 ± 0.00042	0.00140 ± 0.00004	0.00006 ± 0.000045	-0.000003 ± 0.000012	1.10E-14	100.1	14.17679	439.8 ± 2.0	0.46%
24	2.37601 ± 0.00336	0.19083 ± 0.00041	0.00249 ± 0.00003	0.00015 ± 0.000042	0.000039 ± 0.000012	1.66E-14	99.5	12.39013	389.9 ± 1.2	0.30%
25	1.12900 ± 0.00180	0.08014 ± 0.00047	0.00105 ± 0.00002	0.00008 ± 0.000054	-0.000006 ± 0.000012	7.91E-15	100.2	14.08782	437.3 ± 3.0	0.68%
26	1.48256 ± 0.00215	0.12591 ± 0.00029	0.00166 ± 0.00003	0.00006 ± 0.000062	-0.000003 ± 0.000011	1.04E-14	100.1	11.77462	372.4 ± 1.3	0.35%
27	3.01377 ± 0.00515	0.21111 ± 0.00087	0.00250 ± 0.00005	0.00035 ± 0.000074	0.000007 ± 0.000010	2.11E-14	99.9	14.26566	442.2 ± 2.0	0.46%
28	1.06644 ± 0.00139	0.09442 ± 0.00021	0.00112 ± 0.00004	0.00009 ± 0.000055	0.000038 ± 0.000011	7.47E-15	98.9	11.17502	355.2 ± 1.5	0.41%
29	2.33986 ± 0.00262	0.16633 ± 0.00061	0.00207 ± 0.00005	0.00004 ± 0.000051	0.000029 ± 0.000015	1.64E-14	99.6	14.01572	435.3 ± 1.9	0.43%
30	2.09732 ± 0.00243	0.14987 ± 0.00048	0.00181 ± 0.00004	0.00013 ± 0.000084	0.000029 ± 0.000010	1.47E-14	99.6	13.93737	433.2 ± 1.6	0.37%
31	1.76933 ± 0.00157	0.17635 ± 0.00050	0.00221 ± 0.00004	0.00134 ± 0.000041	0.000046 ± 0.000011	1.24E-14	99.2	9.95626	319.7 ± 1.1	0.36%
32	1.44276 ± 0.00189	0.11500 ± 0.00042	0.00144 ± 0.00003	0.00003 ± 0.000074	0.000031 ± 0.000012	1.01E-14	99.4	12.46555	392.0 ± 1.8	0.46%
33	3.83385 ± 0.00269	0.27128 ± 0.00082	0.00346 ± 0.00004	0.00011 ± 0.000058	0.000030 ± 0.000013	2.68E-14	99.8	14.10006	437.7 ± 1.4	0.32%
34	1.65538 ± 0.00174	0.11606 ± 0.00059	0.00152 ± 0.00003	0.00060 ± 0.000073	0.000063 ± 0.000012	1.16E-14	98.9	14.10245	437.7 ± 2.5	0.57%
35	0.97714 ± 0.00198	0.09721 ± 0.00034	0.00130 ± 0.00004	0.00152 ± 0.000075	0.000036 ± 0.000012	6.84E-15	98.9	9.94449	319.3 ± 1.7	0.54%
36	4.76855 ± 0.00468	0.33148 ± 0.00072	0.00434 ± 0.00005	0.00022 ± 0.000029	0.000088 ± 0.000013	3.34E-14	99.5	14.30713	443.4 ± 1.1	0.25%

37	2.40536 ± 0.00301	0.20744 ± 0.00097	0.00263 ± 0.00005	0.00029 ± 0.000067	0.000010 ± 0.000012	1.68E-14	99.9	11.58083	366.9 ± 1.9	0.51%
38	1.86028 ± 0.00155	0.16008 ± 0.00069	0.00204 ± 0.00003	0.00020 ± 0.000039	0.000035 ± 0.000012	1.30E-14	99.4	11.55555	366.1 ± 1.8	0.48%
39	1.73720 ± 0.00209	0.15072 ± 0.00051	0.00193 ± 0.00004	0.00022 ± 0.000056	0.000025 ± 0.000013	1.22E-14	99.6	11.47680	363.9 ± 1.5	0.42%
40	1.80014 ± 0.00353	0.18086 ± 0.00060	0.00231 ± 0.00005	0.00022 ± 0.000052	0.000012 ± 0.000013	1.26E-14	99.8	9.93454	319.0 ± 1.4	0.44%
41	1.43840 ± 0.00150	0.14387 ± 0.00026	0.00187 ± 0.00004	0.00028 ± 0.000048	0.000056 ± 0.000012	1.01E-14	98.9	9.88379	317.5 ± 1.0	0.32%
42	4.18707 ± 0.00306	0.28758 ± 0.00082	0.00377 ± 0.00006	0.00082 ± 0.000082	0.000005 ± 0.000013	2.93E-14	100.0	14.55480	450.2 ± 1.4	0.31%
43	1.59595 ± 0.00364	0.13587 ± 0.00030	0.00172 ± 0.00003	0.00027 ± 0.000091	0.000048 ± 0.000013	1.12E-14	99.1	11.64313	368.6 ± 1.5	0.41%
44	1.57902 ± 0.00291	0.15634 ± 0.00062	0.00207 ± 0.00006	0.00023 ± 0.000055	0.000049 ± 0.000014	1.11E-14	99.1	10.00752	321.2 ± 1.7	0.52%
45	0.79533 ± 0.00118	0.06975 ± 0.00020	0.00089 ± 0.00002	0.00012 ± 0.000057	0.000033 ± 0.000014	5.57E-15	98.8	11.26422	357.8 ± 2.2	0.62%
46	0.64226 ± 0.00118	0.05661 ± 0.00021	0.00068 ± 0.00003	0.00007 ± 0.000064	0.000026 ± 0.000012	4.50E-15	98.8	11.21067	356.2 ± 2.5	0.71%
47	3.02932 ± 0.00267	0.25832 ± 0.00085	0.00332 ± 0.00005	-0.00004 ± 0.000099	0.000028 ± 0.000012	2.12E-14	99.7	11.69500	370.1 ± 1.3	0.36%
48	2.07761 ± 0.00192	0.18417 ± 0.00084	0.00236 ± 0.00003	0.00090 ± 0.000046	0.000046 ± 0.000012	1.46E-14	99.4	11.20814	356.1 ± 1.8	0.50%
49	1.37866 ± 0.00197	0.12096 ± 0.00032	0.00152 ± 0.00004	0.00006 ± 0.000037	0.000024 ± 0.000013	9.66E-15	99.5	11.33898	359.9 ± 1.5	0.41%
50	0.76014 ± 0.00099	0.06788 ± 0.00038	0.00086 ± 0.00003	0.00001 ± 0.000039	-0.000018 ± 0.000011	5.32E-15	100.7	11.19802	355.9 ± 2.5	0.72%
51	0.91614 ± 0.00137	0.09262 ± 0.00046	0.00122 ± 0.00005	0.00005 ± 0.000066	0.000013 ± 0.000012	6.42E-15	99.6	9.84991	316.5 ± 2.1	0.65%
52	0.69371 ± 0.00143	0.07025 ± 0.00043	0.00091 ± 0.00003	0.00007 ± 0.000075	-0.000015 ± 0.000013	4.86E-15	100.7	9.87542	317.3 ± 2.7	0.84%
53	1.77465 ± 0.00249	0.12459 ± 0.00044	0.00162 ± 0.00004	0.00005 ± 0.000051	0.000004 ± 0.000014	1.24E-14	99.9	14.23516	441.4 ± 2.0	0.45%
54	0.86009 ± 0.00092	0.08603 ± 0.00032	0.00115 ± 0.00003	-0.00005 ± 0.000065	-0.000005 ± 0.000014	6.02E-15	100.2	9.99719	320.9 ± 2.0	0.63%
55	3.32814 ± 0.00343	0.24842 ± 0.00111	0.00322 ± 0.00005	0.00005 ± 0.000042	0.000019 ± 0.000012	2.33E-14	99.8	13.37450	417.6 ± 2.0	0.47%
56	7.01961 ± 0.00739	0.51355 ± 0.00043	0.00665 ± 0.00009	0.00010 ± 0.000044	0.000069 ± 0.000013	4.92E-14	99.7	13.62905	424.6 ± 0.6	0.14%
57	1.56293 ± 0.00135	0.10802 ± 0.00022	0.00142 ± 0.00004	0.00021 ± 0.000108	0.000018 ± 0.000013	1.09E-14	99.7	14.42062	446.5 ± 1.5	0.33%
58	1.60704 ± 0.00234	0.13766 ± 0.00053	0.00180 ± 0.00003	0.00005 ± 0.000051	0.000002 ± 0.000013	1.13E-14	100.0	11.66987	369.4 ± 1.8	0.48%
59	0.64259 ± 0.00128	0.06506 ± 0.00029	0.00086 ± 0.00003	-0.00003 ± 0.000048	-0.000006 ± 0.000012	4.50E-15	100.3	9.87711	317.3 ± 2.4	0.76%
60	1.61609 ± 0.00220	0.16235 ± 0.00061	0.00208 ± 0.00005	0.00004 ± 0.000058	0.000012 ± 0.000012	1.13E-14	99.8	9.93182	319.0 ± 1.5	0.46%
61	2.21967 ± 0.00271	0.15499 ± 0.00036	0.00201 ± 0.00005	0.00193 ± 0.000089	0.000044 ± 0.000012	1.55E-14	99.4	14.23811	441.5 ± 1.4	0.31%
62	3.31295 ± 0.00313	0.23098 ± 0.00044	0.00291 ± 0.00003	-0.00003 ± 0.000063	0.000043 ± 0.000011	2.32E-14	99.6	14.28816	442.8 ± 1.0	0.23%
63	2.22493 ± 0.00145	0.15602 ± 0.00053	0.00199 ± 0.00004	0.00062 ± 0.000085	0.000028 ± 0.000012	1.56E-14	99.6	14.20802	440.6 ± 1.7	0.38%
64	1.31576 ± 0.00179	0.13341 ± 0.00044	0.00174 ± 0.00004	0.00022 ± 0.000039	-0.000012 ± 0.000012	9.21E-15	100.3	9.86295	316.9 ± 1.4	0.45%
65	2.23269 ± 0.00194	0.19919 ± 0.00048	0.00257 ± 0.00004	0.00211 ± 0.000084	-0.000011 ± 0.000011	1.56E-14	100.2	11.20986	356.2 ± 1.0	0.29%
66	1.52796 ± 0.00102	0.12384 ± 0.00067	0.00158 ± 0.00002	0.00003 ± 0.000061	-0.000008 ± 0.000011	1.07E-14	100.1	12.33811	388.4 ± 2.3	0.59%
67	3.02217 ± 0.00282	0.20993 ± 0.00065	0.00272 ± 0.00004	0.00027 ± 0.000043	0.000004 ± 0.000013	2.12E-14	100.0	14.39086	445.7 ± 1.6	0.35%
68	1.04252 ± 0.00102	0.10508 ± 0.00046	0.00138 ± 0.00002	0.00013 ± 0.000046	-0.000018 ± 0.000012	7.30E-15	100.5	9.92160	318.7 ± 1.8	0.57%
69	1.78267 ± 0.00164	0.12244 ± 0.00021	0.00165 ± 0.00004	0.00013 ± 0.000049	0.000001 ± 0.000012	1.25E-14	100.0	14.55680	450.2 ± 1.3	0.28%
70	2.79605 ± 0.00229	0.19648 ± 0.00055	0.00248 ± 0.00004	0.00421 ± 0.000045	-0.000010 ± 0.000012	1.96E-14	100.1	14.23290	441.3 ± 1.4	0.32%
71	1.31576 ± 0.00129	0.13182 ± 0.00054	0.00169 ± 0.00002	0.00014 ± 0.000044	0.000002 ± 0.000012	9.21E-15	100.0	9.97744	320.3 ± 1.6	0.50%
72	2.45862 ± 0.00240	0.17058 ± 0.00035	0.00219 ± 0.00004	0.00005 ± 0.000051	0.000018 ± 0.000012	1.72E-14	99.8	14.38150	445.4 ± 1.2	0.27%
73	2.29156 ± 0.00255	0.16071 ± 0.00064	0.00209 ± 0.00004	0.00007 ± 0.000079	0.000059 ± 0.000012	1.60E-14	99.2	14.15040	439.1 ± 2.0	0.44%
74	5.93327 ± 0.00340	0.41093 ± 0.00069	0.00524 ± 0.00004	0.00014 ± 0.000025	0.000166 ± 0.000015	4.16E-14	99.2	14.31958	443.7 ± 0.9	0.19%
75	3.24042 ± 0.00219	0.28031 ± 0.00064	0.00353 ± 0.00005	0.00037 ± 0.000087	0.000047 ± 0.000012	2.27E-14	99.6	11.51100	364.9 ± 1.0	0.26%

76	2.01047 ± 0.00126	0.14128 ± 0.00041	0.00178 ± 0.00003	0.00011 ± 0.000072	0.000055 ± 0.000011	1.41E-14	99.2	14.11540	438.1 ± 1.5	0.34%
77	3.89309 ± 0.00393	0.27503 ± 0.00122	0.00371 ± 0.00008	0.00112 ± 0.000063	0.000037 ± 0.000012	2.73E-14	99.7	14.11592	438.1 ± 2.0	0.46%
78	1.88818 ± 0.00157	0.13172 ± 0.00041	0.00166 ± 0.00004	0.00009 ± 0.000066	0.000055 ± 0.000012	1.32E-14	99.1	14.21221	440.8 ± 1.7	0.37%
79	1.56136 ± 0.00220	0.13180 ± 0.00036	0.00169 ± 0.00004	0.00087 ± 0.000062	0.000055 ± 0.000010	1.09E-14	99.0	11.72444	371.0 ± 1.4	0.37%
80	1.14147 ± 0.00198	0.11497 ± 0.00031	0.00144 ± 0.00004	0.00018 ± 0.000039	0.000013 ± 0.000011	7.99E-15	99.7	9.89417	317.9 ± 1.4	0.43%
81	2.10647 ± 0.00299	0.14808 ± 0.00045	0.00195 ± 0.00002	0.00014 ± 0.000070	0.000023 ± 0.000012	1.48E-14	99.7	14.18019	439.9 ± 1.6	0.37%
82	2.06292 ± 0.00148	0.14716 ± 0.00046	0.00190 ± 0.00004	0.00012 ± 0.000037	0.000022 ± 0.000013	1.44E-14	99.7	13.97458	434.2 ± 1.6	0.37%
83	0.45553 ± 0.00045	0.03819 ± 0.00013	0.00050 ± 0.00003	0.00019 ± 0.000050	0.000005 ± 0.000013	3.19E-15	99.7	11.88982	375.7 ± 3.4	0.91%
84	1.43485 ± 0.00159	0.14255 ± 0.00030	0.00189 ± 0.00004	0.00010 ± 0.000030	-0.000008 ± 0.000012	1.00E-14	100.2	10.06532	322.9 ± 1.1	0.35%
85	1.58577 ± 0.00098	0.12736 ± 0.00048	0.00168 ± 0.00004	0.00020 ± 0.000056	0.000071 ± 0.000014	1.11E-14	98.7	12.28691	387.0 ± 1.8	0.46%
86	1.08616 ± 0.00171	0.10766 ± 0.00036	0.00138 ± 0.00003	0.00019 ± 0.000070	0.000005 ± 0.000014	7.61E-15	99.9	10.07551	323.2 ± 1.7	0.53%
87	1.68402 ± 0.00217	0.14343 ± 0.00042	0.00181 ± 0.00004	0.00009 ± 0.000058	0.000054 ± 0.000012	1.18E-14	99.1	11.63007	368.3 ± 1.4	0.38%
88	1.78414 ± 0.00211	0.12555 ± 0.00058	0.00158 ± 0.00003	0.00005 ± 0.000066	0.000035 ± 0.000012	1.25E-14	99.4	14.12981	438.5 ± 2.3	0.52%
89	1.83281 ± 0.00159	0.18203 ± 0.00070	0.00242 ± 0.00004	0.00019 ± 0.000058	0.000015 ± 0.000012	1.28E-14	99.8	10.04373	322.3 ± 1.4	0.44%
90	2.32490 ± 0.00339	0.17444 ± 0.00044	0.00220 ± 0.00004	0.00003 ± 0.000067	0.000013 ± 0.000012	1.63E-14	99.8	13.30551	415.6 ± 1.4	0.33%
91	1.61076 ± 0.00247	0.11142 ± 0.00043	0.00149 ± 0.00004	0.00012 ± 0.000042	0.000039 ± 0.000013	1.13E-14	99.3	14.35396	444.7 ± 2.1	0.48%
92	1.04239 ± 0.00140	0.08928 ± 0.00026	0.00114 ± 0.00003	-0.00008 ± 0.000051	0.000018 ± 0.000012	7.30E-15	99.5	11.61518	367.8 ± 1.7	0.47%
93	1.59463 ± 0.00167	0.11067 ± 0.00056	0.00142 ± 0.00003	0.00004 ± 0.000055	0.000027 ± 0.000011	1.12E-14	99.5	14.33585	444.2 ± 2.5	0.56%
94	1.87670 ± 0.00243	0.13054 ± 0.00039	0.00181 ± 0.00005	-0.00003 ± 0.000050	0.000034 ± 0.000013	1.31E-14	99.5	14.30009	443.2 ± 1.7	0.39%
95	1.28710 ± 0.00190	0.09045 ± 0.00031	0.00117 ± 0.00003	0.00010 ± 0.000071	0.000005 ± 0.000012	9.01E-15	99.9	14.21476	440.8 ± 2.0	0.46%
96	1.66038 ± 0.00306	0.11610 ± 0.00046	0.00149 ± 0.00004	0.00011 ± 0.000028	0.000017 ± 0.000014	1.16E-14	99.7	14.25808	442.0 ± 2.2	0.51%
97	1.94654 ± 0.00346	0.17305 ± 0.00040	0.00226 ± 0.00003	0.00014 ± 0.000076	0.000016 ± 0.000013	1.36E-14	99.8	11.22095	356.5 ± 1.2	0.35%
98	2.64954 ± 0.00318	0.18635 ± 0.00064	0.00231 ± 0.00004	0.00002 ± 0.000039	0.000020 ± 0.000012	1.86E-14	99.8	14.18663	440.1 ± 1.7	0.39%
99	0.91147 ± 0.00088	0.09138 ± 0.00026	0.00114 ± 0.00003	0.00006 ± 0.000054	0.000027 ± 0.000014	6.38E-15	99.1	9.88829	317.7 ± 1.8	0.56%
100	3.74723 ± 0.00224	0.26115 ± 0.00049	0.00329 ± 0.00004	0.00008 ± 0.000055	0.000018 ± 0.000012	2.62E-14	99.9	14.32903	444.0 ± 1.0	0.22%
101	0.93581 ± 0.00134	0.09290 ± 0.00040	0.00110 ± 0.00002	0.00002 ± 0.000056	0.000023 ± 0.000012	6.55E-15	99.3	9.99995	321.0 ± 1.9	0.59%
102	2.59346 ± 0.00292	0.18339 ± 0.00070	0.00236 ± 0.00005	0.00009 ± 0.000025	0.000004 ± 0.000015	1.82E-14	100.0	14.13482	438.6 ± 1.9	0.44%
103	0.94215 ± 0.00172	0.06601 ± 0.00033	0.00079 ± 0.00004	-0.00028 ± 0.000100	0.000006 ± 0.000014	6.60E-15	99.8	14.24310	441.6 ± 3.1	0.70%
104	1.11274 ± 0.00129	0.11231 ± 0.00066	0.00140 ± 0.00003	0.00016 ± 0.000042	0.000023 ± 0.000014	7.79E-15	99.4	9.84656	316.4 ± 2.3	0.72%
105	1.51061 ± 0.00217	0.10528 ± 0.00049	0.00134 ± 0.00003	0.00015 ± 0.000062	0.000016 ± 0.000015	1.06E-14	99.7	14.30198	443.2 ± 2.5	0.57%
106	1.21556 ± 0.00141	0.10322 ± 0.00030	0.00130 ± 0.00003	0.00000 ± 0.000043	0.000008 ± 0.000014	8.51E-15	99.8	11.75257	371.8 ± 1.7	0.46%
107	8.62819 ± 0.00699	0.61262 ± 0.00171	0.00773 ± 0.00004	0.00424 ± 0.000076	0.000192 ± 0.000019	6.04E-14	99.3	13.99198	434.7 ± 1.3	0.30%
108	7.20097 ± 0.00555	0.50460 ± 0.00101	0.00644 ± 0.00007	0.00039 ± 0.000071	0.000130 ± 0.000012	5.04E-14	99.5	14.19432	440.3 ± 1.0	0.22%
109	2.97601 ± 0.00253	0.25551 ± 0.00047	0.00327 ± 0.00004	0.00014 ± 0.000076	0.000024 ± 0.000013	2.08E-14	99.8	11.61923	368.0 ± 0.9	0.24%
110	2.52944 ± 0.00338	0.17785 ± 0.00052	0.00231 ± 0.00003	0.00014 ± 0.000055	0.000025 ± 0.000011	1.77E-14	99.7	14.18106	439.9 ± 1.5	0.35%
111	3.03500 ± 0.00281	0.21089 ± 0.00084	0.00266 ± 0.00004	0.00022 ± 0.000083	0.000039 ± 0.000012	2.13E-14	99.6	14.33723	444.2 ± 1.9	0.43%
112	3.34283 ± 0.00411	0.23132 ± 0.00075	0.00294 ± 0.00005	0.00020 ± 0.000065	0.000034 ± 0.000011	2.34E-14	99.7	14.40710	446.1 ± 1.6	0.36%

au21.1j.mus (BRK 1004) Mitchell Moore *j=0.019472±0.000018 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
1	8.01745 ± 0.01002	0.69741 ± 0.00159	0.00924 ± 0.00005	0.01054 ± 0.000093	0.000738 ± 0.000018	5.61E-14	97.3	11.18491	355.5 ± 1.0	0.28%
2	9.20371 ± 0.01244	0.63725 ± 0.00120	0.00821 ± 0.00008	0.04040 ± 0.000378	0.000144 ± 0.000014	6.45E-14	99.6	14.38227	445.4 ± 1.1	0.24%
3	4.60323 ± 0.00555	0.40091 ± 0.00119	0.00510 ± 0.00004	0.00042 ± 0.000053	0.000219 ± 0.000016	3.22E-14	98.6	11.32040	359.4 ± 1.2	0.34%
4	6.32208 ± 0.01012	0.55656 ± 0.00167	0.00706 ± 0.00005	0.00235 ± 0.000064	0.000376 ± 0.000015	4.43E-14	98.2	11.15994	354.8 ± 1.3	0.35%
5	7.85449 ± 0.00308	0.69709 ± 0.00145	0.00892 ± 0.00008	0.00146 ± 0.000078	0.000216 ± 0.000012	5.50E-14	99.2	11.17605	355.2 ± 0.8	0.22%
6	4.57106 ± 0.00515	0.31729 ± 0.00046	0.00411 ± 0.00004	0.00044 ± 0.000049	0.000051 ± 0.000012	3.20E-14	99.7	14.35939	444.8 ± 0.9	0.20%
7	5.94707 ± 0.00371	0.41565 ± 0.00113	0.00540 ± 0.00006	0.00027 ± 0.000052	0.000120 ± 0.000013	4.16E-14	99.4	14.22228	441.0 ± 1.3	0.29%
8	3.00485 ± 0.00165	0.24298 ± 0.00076	0.00301 ± 0.00004	0.00156 ± 0.000065	0.000074 ± 0.000014	2.10E-14	99.3	12.27685	386.7 ± 1.3	0.35%
9	8.67723 ± 0.00776	0.60402 ± 0.00116	0.00781 ± 0.00004	0.00285 ± 0.000105	0.000228 ± 0.000014	6.08E-14	99.2	14.25478	441.9 ± 1.0	0.22%
10	2.58119 ± 0.00106	0.23065 ± 0.00063	0.00277 ± 0.00005	0.00014 ± 0.000035	0.000020 ± 0.000012	1.81E-14	99.8	11.16588	354.9 ± 1.1	0.31%
11	3.13126 ± 0.00468	0.27759 ± 0.00056	0.00358 ± 0.00003	0.00052 ± 0.000092	0.000022 ± 0.000011	2.19E-14	99.8	11.25647	357.5 ± 1.0	0.27%
12	4.63217 ± 0.00233	0.32462 ± 0.00077	0.00423 ± 0.00005	0.00283 ± 0.000062	0.000060 ± 0.000014	3.24E-14	99.6	14.21564	440.8 ± 1.1	0.26%
13	5.63287 ± 0.00501	0.38891 ± 0.00100	0.00504 ± 0.00005	0.00107 ± 0.000067	0.000142 ± 0.000015	3.94E-14	99.3	14.37631	445.3 ± 1.3	0.28%
14	3.90347 ± 0.00704	0.27318 ± 0.00056	0.00366 ± 0.00004	0.00064 ± 0.000051	0.000054 ± 0.000012	2.73E-14	99.6	14.23065	441.3 ± 1.3	0.29%
15	4.04621 ± 0.00562	0.27933 ± 0.00084	0.00356 ± 0.00006	0.00032 ± 0.000067	-0.000019 ± 0.000019	2.83E-14	100.1	14.48550	448.3 ± 1.6	0.36%
16	1.03315 ± 0.00110	0.09109 ± 0.00039	0.00117 ± 0.00003	0.00000 ± 0.000042	0.000025 ± 0.000012	7.24E-15	99.3	11.26188	357.7 ± 2.0	0.56%
17	1.80959 ± 0.00346	0.16037 ± 0.00051	0.00215 ± 0.00003	0.00038 ± 0.000047	0.000104 ± 0.000014	1.27E-14	98.3	11.09253	352.8 ± 1.6	0.44%
18	2.34824 ± 0.00636	0.16096 ± 0.00083	0.00235 ± 0.00008	0.00017 ± 0.000059	0.000088 ± 0.000012	1.64E-14	98.9	14.42753	446.7 ± 2.7	0.61%
19	5.04446 ± 0.00535	0.41658 ± 0.00038	0.00544 ± 0.00004	0.00062 ± 0.000047	0.000106 ± 0.000014	3.53E-14	99.4	12.03393	379.8 ± 0.6	0.16%
20	6.35723 ± 0.01508	0.44121 ± 0.00119	0.00561 ± 0.00008	0.00065 ± 0.000057	0.000037 ± 0.000012	4.45E-14	99.8	14.38406	445.5 ± 1.6	0.36%
21	2.09440 ± 0.00231	0.14557 ± 0.00050	0.00180 ± 0.00005	0.00039 ± 0.000049	0.000019 ± 0.000017	1.47E-14	99.7	14.35005	444.5 ± 1.9	0.44%
22	6.30365 ± 0.00551	0.43747 ± 0.00095	0.00562 ± 0.00006	0.00130 ± 0.000067	0.000067 ± 0.000014	4.41E-14	99.7	14.36451	444.9 ± 1.1	0.24%
23	2.66574 ± 0.00302	0.18700 ± 0.00041	0.00234 ± 0.00004	0.00020 ± 0.000058	0.000043 ± 0.000014	1.87E-14	99.5	14.18825	440.1 ± 1.3	0.29%
24	5.11361 ± 0.00978	0.35838 ± 0.00121	0.00452 ± 0.00004	0.00043 ± 0.000054	0.000056 ± 0.000014	3.58E-14	99.7	14.22251	441.0 ± 1.8	0.40%
25	3.26973 ± 0.00621	0.22544 ± 0.00047	0.00291 ± 0.00003	0.00014 ± 0.000058	0.000025 ± 0.000014	2.29E-14	99.8	14.47201	447.9 ± 1.4	0.31%
26	3.51963 ± 0.00764	0.28263 ± 0.00065	0.00363 ± 0.00004	0.00065 ± 0.000066	0.000037 ± 0.000018	2.46E-14	99.7	12.41475	390.6 ± 1.4	0.35%
27	1.46890 ± 0.00226	0.12937 ± 0.00053	0.00169 ± 0.00003	0.00019 ± 0.000041	0.000051 ± 0.000012	1.03E-14	99.0	11.23849	357.0 ± 1.8	0.51%
28	1.27423 ± 0.00178	0.08938 ± 0.00044	0.00117 ± 0.00004	0.00003 ± 0.000054	0.000018 ± 0.000019	8.92E-15	99.6	14.19733	440.3 ± 3.0	0.67%
29	2.65476 ± 0.00850	0.18793 ± 0.00084	0.00242 ± 0.00003	0.00011 ± 0.000030	0.000032 ± 0.000022	1.86E-14	99.6	14.07668	437.0 ± 2.6	0.60%
30	4.09951 ± 0.00512	0.32270 ± 0.00050	0.00421 ± 0.00003	0.00057 ± 0.000026	0.000091 ± 0.000023	2.87E-14	99.3	12.62106	396.4 ± 1.0	0.26%
31	1.70582 ± 0.00275	0.14161 ± 0.00025	0.00189 ± 0.00003	0.00067 ± 0.000041	0.000108 ± 0.000027	1.19E-14	98.1	11.82081	373.7 ± 2.0	0.53%
32	2.36613 ± 0.00325	0.20800 ± 0.00091	0.00268 ± 0.00003	0.00035 ± 0.000054	0.000110 ± 0.000026	1.66E-14	98.6	11.21881	356.5 ± 2.0	0.57%
33	2.90980 ± 0.00288	0.25766 ± 0.00060	0.00326 ± 0.00005	0.00051 ± 0.000058	0.000054 ± 0.000012	2.04E-14	99.5	11.23178	356.8 ± 1.0	0.28%
34	4.65322 ± 0.00482	0.32581 ± 0.00091	0.00426 ± 0.00003	0.00013 ± 0.000057	0.000087 ± 0.000024	3.26E-14	99.4	14.20291	440.5 ± 1.5	0.34%
35	5.15342 ± 0.00400	0.39544 ± 0.00087	0.00512 ± 0.00003	0.00003 ± 0.000032	0.000035 ± 0.000019	3.61E-14	99.8	13.00577	407.3 ± 1.1	0.26%
36	5.08132 ± 0.00560	0.35098 ± 0.00082	0.00445 ± 0.00004	0.00020 ± 0.000064	0.000029 ± 0.000026	3.56E-14	99.8	14.45352	447.4 ± 1.3	0.30%

37	8.80817 ± 0.00926	0.61637 ± 0.00146	0.00810 ± 0.00009	0.00190 ± 0.000061	0.000162 ± 0.000026	6.17E-14	99.5	14.21313	440.8 ± 1.2	0.27%
38	6.35794 ± 0.00611	0.44799 ± 0.00077	0.00567 ± 0.00006	0.00275 ± 0.000042	0.000038 ± 0.000028	4.45E-14	99.8	14.16808	439.5 ± 1.0	0.24%
39	1.08560 ± 0.00201	0.07583 ± 0.00028	0.00094 ± 0.00003	-0.00003 ± 0.000047	-0.000060 ± 0.000024	7.60E-15	101.6	14.31639	443.6 ± 3.4	0.77%
40	4.06431 ± 0.00262	0.28116 ± 0.00078	0.00365 ± 0.00004	0.00015 ± 0.000067	0.000024 ± 0.000019	2.85E-14	99.8	14.43046	446.7 ± 1.4	0.32%
41	2.90908 ± 0.00233	0.20332 ± 0.00064	0.00264 ± 0.00004	0.00027 ± 0.000044	0.000041 ± 0.000012	2.04E-14	99.6	14.24755	441.7 ± 1.6	0.35%
42	2.98849 ± 0.00303	0.20747 ± 0.00083	0.00266 ± 0.00005	0.00027 ± 0.000063	-0.000001 ± 0.000020	2.09E-14	100.0	14.40459	446.0 ± 2.0	0.46%
43	6.36273 ± 0.00406	0.46630 ± 0.00114	0.00611 ± 0.00005	0.00103 ± 0.000046	0.000080 ± 0.000022	4.46E-14	99.6	13.59446	423.7 ± 1.2	0.27%
44	2.42524 ± 0.00168	0.16797 ± 0.00041	0.00214 ± 0.00003	0.00068 ± 0.000065	0.000048 ± 0.000023	1.70E-14	99.4	14.35369	444.6 ± 1.7	0.38%
45	2.36235 ± 0.00285	0.20162 ± 0.00041	0.00268 ± 0.00004	0.00003 ± 0.000044	0.000052 ± 0.000023	1.65E-14	99.3	11.64063	368.6 ± 1.4	0.38%
46	3.43655 ± 0.00213	0.24130 ± 0.00075	0.00311 ± 0.00003	0.00056 ± 0.000046	0.000017 ± 0.000020	2.41E-14	99.9	14.22082	441.0 ± 1.6	0.36%
47	2.74324 ± 0.00183	0.19250 ± 0.00067	0.00240 ± 0.00004	0.00002 ± 0.000054	0.000009 ± 0.000018	1.92E-14	99.9	14.23672	441.4 ± 1.8	0.40%
48	1.50974 ± 0.00155	0.10500 ± 0.00031	0.00133 ± 0.00003	-0.00005 ± 0.000041	0.000003 ± 0.000021	1.06E-14	99.9	14.37005	445.1 ± 2.3	0.51%
49	2.02722 ± 0.00179	0.17769 ± 0.00049	0.00228 ± 0.00004	0.00014 ± 0.000053	0.000002 ± 0.000021	1.42E-14	100.0	11.40507	361.8 ± 1.5	0.42%
50	3.93726 ± 0.00882	0.27265 ± 0.00139	0.00346 ± 0.00004	0.00007 ± 0.000054	0.000008 ± 0.000019	2.76E-14	99.9	14.43173	446.8 ± 2.6	0.58%
51	7.49316 ± 0.00610	0.52251 ± 0.00103	0.00681 ± 0.00010	0.00254 ± 0.000075	0.000106 ± 0.000025	5.25E-14	99.6	14.28097	442.6 ± 1.0	0.24%
52	6.01783 ± 0.00561	0.41797 ± 0.00088	0.00539 ± 0.00007	0.00012 ± 0.000079	0.000080 ± 0.000020	4.21E-14	99.6	14.34145	444.3 ± 1.1	0.25%
53	3.58963 ± 0.00282	0.24795 ± 0.00037	0.00314 ± 0.00005	0.00041 ± 0.000053	0.000033 ± 0.000012	2.51E-14	99.7	14.43772	446.9 ± 0.9	0.20%
54	3.05014 ± 0.00340	0.21163 ± 0.00060	0.00271 ± 0.00006	0.00011 ± 0.000047	-0.000008 ± 0.000020	2.14E-14	100.1	14.41291	446.3 ± 1.6	0.36%
55	5.20719 ± 0.00636	0.36672 ± 0.00078	0.00467 ± 0.00005	0.00184 ± 0.000058	0.000053 ± 0.000030	3.65E-14	99.7	14.15682	439.2 ± 1.3	0.30%
56	10.14178 ± 0.00833	0.70619 ± 0.00155	0.00917 ± 0.00007	0.00053 ± 0.000056	0.000190 ± 0.000030	7.10E-14	99.4	14.28199	442.7 ± 1.1	0.25%
57	3.97837 ± 0.00274	0.27834 ± 0.00077	0.00360 ± 0.00005	0.00053 ± 0.000062	0.000089 ± 0.000030	2.79E-14	99.3	14.19951	440.4 ± 1.6	0.36%
58	4.52904 ± 0.00703	0.31167 ± 0.00095	0.00401 ± 0.00003	0.00059 ± 0.000037	0.000105 ± 0.000024	3.17E-14	99.3	14.43174	446.8 ± 1.7	0.38%
59	3.69720 ± 0.00339	0.25789 ± 0.00065	0.00335 ± 0.00003	0.00010 ± 0.000052	0.000066 ± 0.000029	2.59E-14	99.5	14.26126	442.1 ± 1.6	0.35%
60	4.19582 ± 0.00417	0.29293 ± 0.00103	0.00377 ± 0.00005	0.00698 ± 0.000141	0.000075 ± 0.000030	2.94E-14	99.5	14.24999	441.8 ± 1.9	0.42%
61	2.18061 ± 0.00255	0.15204 ± 0.00059	0.00194 ± 0.00004	0.00075 ± 0.000040	0.000052 ± 0.000030	1.53E-14	99.3	14.24283	441.6 ± 2.5	0.58%
62	2.87585 ± 0.00249	0.25358 ± 0.00062	0.00327 ± 0.00003	0.00088 ± 0.000051	0.000036 ± 0.000029	2.01E-14	99.6	11.29958	358.8 ± 1.4	0.39%
63	1.48663 ± 0.00252	0.12815 ± 0.00035	0.00163 ± 0.00004	0.00034 ± 0.000062	0.000021 ± 0.000020	1.04E-14	99.6	11.55230	366.0 ± 1.9	0.51%
64	7.48437 ± 0.00639	0.51794 ± 0.00097	0.00675 ± 0.00007	0.00018 ± 0.000037	0.000168 ± 0.000021	5.24E-14	99.3	14.35441	444.7 ± 1.0	0.22%
65	2.61270 ± 0.00380	0.20582 ± 0.00076	0.00269 ± 0.00003	0.00036 ± 0.000045	0.000054 ± 0.000021	1.83E-14	99.4	12.61739	396.3 ± 1.8	0.47%
66	10.57029 ± 0.00419	0.73309 ± 0.00128	0.00941 ± 0.00008	0.00278 ± 0.000043	0.000353 ± 0.000022	7.40E-14	99.0	14.27705	442.5 ± 0.8	0.19%
67	1.22264 ± 0.00172	0.10873 ± 0.00045	0.00140 ± 0.00003	0.00027 ± 0.000056	0.000035 ± 0.000027	8.56E-15	99.2	11.14962	354.5 ± 2.8	0.79%
68	3.78285 ± 0.00383	0.26373 ± 0.00088	0.00336 ± 0.00004	0.00005 ± 0.000057	0.000009 ± 0.000021	2.65E-14	99.9	14.33331	444.1 ± 1.7	0.39%
69	5.03445 ± 0.00317	0.35428 ± 0.00107	0.00461 ± 0.00006	0.00095 ± 0.000059	0.000001 ± 0.000021	3.53E-14	100.0	14.21006	440.7 ± 1.5	0.33%
70	7.46744 ± 0.00651	0.52160 ± 0.00149	0.00697 ± 0.00006	0.00510 ± 0.000075	0.000084 ± 0.000027	5.23E-14	99.7	14.26998	442.3 ± 1.4	0.32%
71	6.90232 ± 0.00544	0.47972 ± 0.00139	0.00625 ± 0.00006	0.00540 ± 0.000142	0.000044 ± 0.000022	4.83E-14	99.8	14.36208	444.9 ± 1.4	0.31%
72	4.77374 ± 0.00228	0.32968 ± 0.00112	0.00419 ± 0.00005	0.00093 ± 0.000045	0.000104 ± 0.000023	3.34E-14	99.4	14.38734	445.6 ± 1.7	0.37%
73	4.47548 ± 0.00343	0.39309 ± 0.00068	0.00528 ± 0.00005	0.00048 ± 0.000069	0.000158 ± 0.000020	3.13E-14	99.0	11.26692	357.8 ± 0.8	0.23%
74	2.06432 ± 0.00217	0.14243 ± 0.00062	0.00183 ± 0.00004	0.00007 ± 0.000051	0.000092 ± 0.000013	1.45E-14	98.7	14.30362	443.3 ± 2.2	0.50%
75	7.70793 ± 0.00525	0.58303 ± 0.00086	0.00753 ± 0.00007	0.00084 ± 0.000035	0.000174 ± 0.000011	5.40E-14	99.3	13.13242	410.8 ± 0.7	0.17%

76	2.40623 ± 0.00298	0.16762 ± 0.00035	0.00224 ± 0.00003	0.00048 ± 0.000043	0.000072 ± 0.000011	1.69E-14	99.1	14.22796	441.2 ± 1.2	0.28%
77	3.11968 ± 0.00456	0.24332 ± 0.00052	0.00321 ± 0.00005	0.00062 ± 0.000053	0.000131 ± 0.000013	2.18E-14	98.8	12.66268	397.6 ± 1.2	0.29%
78	2.31974 ± 0.00188	0.16425 ± 0.00077	0.00208 ± 0.00004	0.00053 ± 0.000040	0.000026 ± 0.000022	1.62E-14	99.7	14.07715	437.0 ± 2.4	0.56%
79	4.85413 ± 0.00489	0.36820 ± 0.00095	0.00475 ± 0.00006	0.00077 ± 0.000044	0.000048 ± 0.000013	3.40E-14	99.7	13.14539	411.2 ± 1.2	0.29%
80	0.11250 ± 0.00026	0.00833 ± 0.00015	0.00009 ± 0.00002	0.00027 ± 0.000049	0.000028 ± 0.000012	7.88E-16	92.6	12.51412	393.4 ± 15.5	3.94%
81	1.58423 ± 0.00261	0.12137 ± 0.00030	0.00156 ± 0.00003	0.00025 ± 0.000071	0.000077 ± 0.000021	1.11E-14	98.6	12.86629	403.3 ± 2.0	0.51%
82	1.97240 ± 0.00262	0.13731 ± 0.00063	0.00174 ± 0.00003	0.00005 ± 0.000056	0.000021 ± 0.000013	1.38E-14	99.7	14.32028	443.7 ± 2.3	0.52%
83	5.56629 ± 0.00564	0.38651 ± 0.00070	0.00500 ± 0.00004	0.00020 ± 0.000058	0.000074 ± 0.000023	3.90E-14	99.6	14.34459	444.4 ± 1.1	0.24%
84	2.11489 ± 0.00168	0.14788 ± 0.00057	0.00188 ± 0.00003	0.00018 ± 0.000064	-0.000016 ± 0.000023	1.48E-14	100.2	14.30167	443.2 ± 2.2	0.50%
85	4.19120 ± 0.00467	0.28918 ± 0.00063	0.00381 ± 0.00005	0.00023 ± 0.000050	0.000084 ± 0.000017	2.94E-14	99.4	14.40716	446.1 ± 1.2	0.27%
86	3.43561 ± 0.00312	0.23976 ± 0.00056	0.00313 ± 0.00003	0.00005 ± 0.000039	0.000012 ± 0.000012	2.41E-14	99.9	14.31490	443.6 ± 1.2	0.27%
87	5.88765 ± 0.00286	0.41087 ± 0.00070	0.00536 ± 0.00005	0.00108 ± 0.000049	0.000087 ± 0.000021	4.12E-14	99.6	14.26731	442.3 ± 0.9	0.21%
88	3.37847 ± 0.00327	0.23461 ± 0.00047	0.00304 ± 0.00003	0.00211 ± 0.000054	0.000050 ± 0.000019	2.37E-14	99.6	14.33812	444.2 ± 1.2	0.28%
89	0.23392 ± 0.00047	0.01612 ± 0.00007	0.00022 ± 0.00003	0.00007 ± 0.000043	0.000001 ± 0.000019	1.64E-15	99.9	14.49408	448.5 ± 10.8	2.41%
90	3.75417 ± 0.00193	0.25788 ± 0.00044	0.00342 ± 0.00005	0.01032 ± 0.000134	0.000300 ± 0.000015	2.63E-14	97.7	14.21838	440.9 ± 1.0	0.22%
91	0.84350 ± 0.00105	0.07520 ± 0.00041	0.00097 ± 0.00003	0.00042 ± 0.000064	-0.000012 ± 0.000022	5.91E-15	100.4	11.21780	356.4 ± 3.4	0.95%
92	2.24003 ± 0.00231	0.15370 ± 0.00047	0.00200 ± 0.00003	0.00098 ± 0.000062	0.000023 ± 0.000019	1.57E-14	99.7	14.53074	449.5 ± 1.9	0.41%
93	3.69650 ± 0.00173	0.25803 ± 0.00074	0.00333 ± 0.00005	0.00098 ± 0.000075	0.000060 ± 0.000020	2.59E-14	99.5	14.25800	442.0 ± 1.5	0.33%
94	3.23216 ± 0.00172	0.22470 ± 0.00065	0.00287 ± 0.00003	0.00119 ± 0.000066	0.000010 ± 0.000018	2.26E-14	99.9	14.37167	445.1 ± 1.5	0.34%
95	2.51378 ± 0.00295	0.17429 ± 0.00038	0.00227 ± 0.00004	0.00006 ± 0.000039	0.000038 ± 0.000021	1.76E-14	99.6	14.35888	444.8 ± 1.6	0.35%
96	4.38797 ± 0.03701	0.32779 ± 0.00422	0.00452 ± 0.00033	0.00036 ± 0.000072	0.000034 ± 0.000084	3.07E-14	99.8	13.35546	417.0 ± 6.8	1.64%
97	1.61079 ± 0.00151	0.11126 ± 0.00046	0.00143 ± 0.00005	0.00010 ± 0.000042	0.000091 ± 0.000024	1.13E-14	98.3	14.23657	441.4 ± 2.7	0.62%
98	3.95145 ± 0.00334	0.27625 ± 0.00092	0.00382 ± 0.00005	0.00071 ± 0.000097	0.000078 ± 0.000025	2.77E-14	99.4	14.22121	441.0 ± 1.7	0.39%
99	1.61829 ± 0.00137	0.11149 ± 0.00032	0.00148 ± 0.00005	0.00013 ± 0.000056	0.000028 ± 0.000013	1.13E-14	99.5	14.44049	447.0 ± 1.7	0.39%
100	3.13530 ± 0.00344	0.24674 ± 0.00072	0.00310 ± 0.00004	0.00033 ± 0.000058	0.000095 ± 0.000012	2.20E-14	99.1	12.59299	395.6 ± 1.3	0.33%
101	3.45765 ± 0.00538	0.30112 ± 0.00076	0.00390 ± 0.00004	0.00038 ± 0.000051	0.000162 ± 0.000013	2.42E-14	98.6	11.32328	359.5 ± 1.1	0.32%
102	3.16164 ± 0.00159	0.21977 ± 0.00033	0.00276 ± 0.00003	0.00013 ± 0.000051	0.000047 ± 0.000013	2.21E-14	99.6	14.32279	443.8 ± 0.9	0.20%
103	3.92355 ± 0.00478	0.27373 ± 0.00058	0.00348 ± 0.00004	0.00257 ± 0.000066	0.000052 ± 0.000011	2.75E-14	99.6	14.27837	442.6 ± 1.1	0.26%
104	2.28573 ± 0.00262	0.20150 ± 0.00062	0.00259 ± 0.00004	0.00022 ± 0.000050	0.000062 ± 0.000010	1.60E-14	99.2	11.25215	357.4 ± 1.3	0.36%
105	3.27001 ± 0.00214	0.22653 ± 0.00073	0.00290 ± 0.00004	0.00036 ± 0.000067	0.000095 ± 0.000013	2.29E-14	99.1	14.31180	443.5 ± 1.6	0.35%

au21.1l.mus (BRK 1056) Mitchell Moore j=0.0138472±0.000006*Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
1	3.14800 ± 0.00309	0.26417 ± 0.00086	0.00343 ± 0.00003	0.00120 ± 0.000245	0.000045 ± 0.000021	2.20E-14	99.6	11.86657	375.0 ± 1.5	0.40%
2	3.49276 ± 0.00320	0.31247 ± 0.00098	0.00409 ± 0.00006	0.00038 ± 0.000208	0.000083 ± 0.000020	2.45E-14	99.3	11.09942	353.0 ± 1.3	0.37%
3	2.64133 ± 0.00200	0.26344 ± 0.00064	0.00341 ± 0.00008	0.00000 ± 0.000168	-0.000033 ± 0.000018	1.85E-14	100.4	10.02639	321.7 ± 1.1	0.33%
4	2.53791 ± 0.00455	0.20907 ± 0.00094	0.00265 ± 0.00005	0.00017 ± 0.000171	-0.000006 ± 0.000018	1.78E-14	100.1	12.13922	382.8 ± 2.0	0.53%
5	1.91836 ± 0.00231	0.19197 ± 0.00062	0.00246 ± 0.00004	-0.00003 ± 0.000195	-0.000002 ± 0.000018	1.34E-14	100.0	9.99276	320.8 ± 1.4	0.44%

6	1.70089 ± 0.00165	0.16946 ± 0.00051	0.00224 ± 0.00004	0.00034 ± 0.000156	-0.000087 ± 0.000028	1.19E-14	101.5	10.03712	322.1 ± 1.9	0.57%
7	2.38546 ± 0.00097	0.19878 ± 0.00045	0.00259 ± 0.00005	0.00034 ± 0.000164	0.000116 ± 0.000030	1.67E-14	98.6	11.82774	373.9 ± 1.6	0.44%
8	1.95712 ± 0.00142	0.16577 ± 0.00044	0.00215 ± 0.00005	0.00036 ± 0.000141	0.000076 ± 0.000030	1.37E-14	98.9	11.67148	369.5 ± 2.0	0.53%
9	1.54382 ± 0.00185	0.15329 ± 0.00056	0.00200 ± 0.00005	0.00058 ± 0.000186	0.000007 ± 0.000038	1.08E-14	99.9	10.05702	322.6 ± 2.7	0.83%
10	2.55162 ± 0.00285	0.25378 ± 0.00082	0.00332 ± 0.00005	0.00030 ± 0.000112	0.000123 ± 0.000028	1.79E-14	98.6	9.91098	318.3 ± 1.5	0.48%
11	1.27861 ± 0.00136	0.12757 ± 0.00055	0.00170 ± 0.00004	0.00010 ± 0.000178	0.000092 ± 0.000029	8.95E-15	97.9	9.81026	315.4 ± 2.6	0.83%
12	2.65981 ± 0.00226	0.23445 ± 0.00079	0.00301 ± 0.00006	0.00049 ± 0.000129	0.000033 ± 0.000018	1.86E-14	99.6	11.30390	358.9 ± 1.4	0.40%
13	2.34469 ± 0.00192	0.23249 ± 0.00059	0.00291 ± 0.00006	0.00072 ± 0.000156	0.000057 ± 0.000018	1.64E-14	99.3	10.01253	321.3 ± 1.1	0.36%
14	2.36026 ± 0.00206	0.23441 ± 0.00075	0.00313 ± 0.00004	0.00036 ± 0.000155	0.000028 ± 0.000019	1.65E-14	99.7	10.03414	322.0 ± 1.3	0.41%
15	1.07160 ± 0.00183	0.10354 ± 0.00031	0.00131 ± 0.00004	0.00054 ± 0.000177	0.000058 ± 0.000016	7.50E-15	98.4	10.18384	326.4 ± 1.9	0.58%
16	2.04788 ± 0.00163	0.18357 ± 0.00046	0.00251 ± 0.00006	0.00049 ± 0.000169	0.000000 ± 0.000020	1.43E-14	100.0	11.15571	354.6 ± 1.4	0.40%
17	3.21696 ± 0.00236	0.22298 ± 0.00073	0.00281 ± 0.00005	0.00105 ± 0.000278	0.000023 ± 0.000022	2.25E-14	99.8	14.39674	445.8 ± 1.7	0.39%
18	2.11173 ± 0.00228	0.20886 ± 0.00073	0.00266 ± 0.00005	0.00057 ± 0.000218	0.000125 ± 0.000025	1.48E-14	98.3	9.93393	319.0 ± 1.6	0.51%
19	1.60668 ± 0.00150	0.15894 ± 0.00045	0.00205 ± 0.00003	0.00046 ± 0.000169	0.000079 ± 0.000023	1.13E-14	98.5	9.96136	319.8 ± 1.7	0.52%
20	1.25401 ± 0.00176	0.12556 ± 0.00054	0.00156 ± 0.00004	-0.00002 ± 0.000236	0.000015 ± 0.000022	8.78E-15	99.6	9.95131	319.5 ± 2.2	0.69%
21	1.31417 ± 0.00722	0.09422 ± 0.00057	0.00126 ± 0.00004	-0.00003 ± 0.000257	0.000025 ± 0.000021	9.20E-15	99.4	13.86966	431.3 ± 4.1	0.95%
22	2.35008 ± 0.00476	0.22837 ± 0.00046	0.00291 ± 0.00005	-0.00001 ± 0.000167	0.000115 ± 0.000035	1.65E-14	98.6	10.14220	325.1 ± 1.7	0.53%
23	1.72509 ± 0.00112	0.17184 ± 0.00054	0.00219 ± 0.00006	0.00034 ± 0.000121	-0.000091 ± 0.000045	1.21E-14	101.6	10.03899	322.1 ± 2.7	0.83%
24	1.29654 ± 0.00163	0.12673 ± 0.00071	0.00170 ± 0.00005	0.00025 ± 0.000202	0.000054 ± 0.000034	9.08E-15	98.8	10.10520	324.1 ± 3.2	0.98%
25	4.80544 ± 0.03251	0.32511 ± 0.00242	0.00429 ± 0.00007	0.00055 ± 0.000271	0.000148 ± 0.000035	3.37E-14	99.1	14.64713	452.7 ± 4.7	1.04%
26	2.44076 ± 0.01039	0.20342 ± 0.00055	0.00260 ± 0.00005	0.00025 ± 0.000146	-0.000019 ± 0.000035	1.71E-14	100.2	11.99855	378.8 ± 2.5	0.66%
27	1.11527 ± 0.00147	0.11145 ± 0.00040	0.00150 ± 0.00006	0.00090 ± 0.000187	0.000071 ± 0.000036	7.81E-15	98.1	9.81993	315.7 ± 3.3	1.06%
28	1.30032 ± 0.00248	0.13030 ± 0.00051	0.00173 ± 0.00006	0.00040 ± 0.000217	0.000054 ± 0.000035	9.11E-15	98.8	9.85687	316.8 ± 2.9	0.93%
29	1.39984 ± 0.00165	0.11497 ± 0.00062	0.00154 ± 0.00007	0.00118 ± 0.000175	0.000089 ± 0.000036	9.80E-15	98.1	11.94751	377.3 ± 3.6	0.95%
30	1.61436 ± 0.00172	0.16085 ± 0.00045	0.00217 ± 0.00007	0.00045 ± 0.000140	0.000065 ± 0.000037	1.13E-14	98.8	9.91713	318.5 ± 2.4	0.75%
31	1.20752 ± 0.00224	0.09851 ± 0.00026	0.00133 ± 0.00005	0.00033 ± 0.000162	0.000149 ± 0.000037	8.46E-15	96.4	11.81114	373.4 ± 3.7	0.99%
32	1.77090 ± 0.00168	0.17743 ± 0.00055	0.00225 ± 0.00004	0.00020 ± 0.000173	0.000017 ± 0.000043	1.24E-14	99.7	9.95319	319.6 ± 2.5	0.79%
33	1.37256 ± 0.00162	0.12186 ± 0.00060	0.00154 ± 0.00003	0.00021 ± 0.000146	0.000041 ± 0.000037	9.61E-15	99.1	11.16272	354.8 ± 3.4	0.96%
34	2.30150 ± 0.00327	0.16521 ± 0.00031	0.00210 ± 0.00004	-0.00042 ± 0.000329	0.000083 ± 0.000038	1.61E-14	98.9	13.78206	428.9 ± 2.3	0.54%
35	1.55208 ± 0.00170	0.15608 ± 0.00031	0.00206 ± 0.00005	0.00049 ± 0.000180	0.000068 ± 0.000037	1.09E-14	98.7	9.81660	315.6 ± 2.4	0.75%
36	1.69226 ± 0.00165	0.14119 ± 0.00064	0.00177 ± 0.00004	-0.00008 ± 0.000160	0.000029 ± 0.000043	1.19E-14	99.5	11.92478	376.7 ± 3.3	0.89%
37	1.66026 ± 0.00182	0.14701 ± 0.00022	0.00189 ± 0.00005	-0.00013 ± 0.000161	0.000137 ± 0.000027	1.16E-14	97.6	11.01801	350.7 ± 1.8	0.52%
38	2.01739 ± 0.00190	0.19958 ± 0.00062	0.00263 ± 0.00006	-0.00007 ± 0.000154	0.000055 ± 0.000026	1.41E-14	99.2	10.02691	321.8 ± 1.6	0.50%
39	1.74843 ± 0.00125	0.17384 ± 0.00054	0.00224 ± 0.00005	0.00018 ± 0.000202	0.000011 ± 0.000028	1.22E-14	99.8	10.03837	322.1 ± 1.8	0.57%
40	2.38461 ± 0.00264	0.23691 ± 0.00033	0.00293 ± 0.00006	0.00036 ± 0.000210	0.000038 ± 0.000027	1.67E-14	99.5	10.01846	321.5 ± 1.2	0.38%
41	2.54486 ± 0.00342	0.22155 ± 0.00053	0.00288 ± 0.00005	0.00006 ± 0.000185	0.000008 ± 0.000027	1.78E-14	99.9	11.47605	363.9 ± 1.5	0.42%
42	1.74021 ± 0.00192	0.17401 ± 0.00046	0.00219 ± 0.00006	0.00144 ± 0.000220	0.000023 ± 0.000027	1.22E-14	99.6	9.96227	319.9 ± 1.7	0.55%
43	1.10031 ± 0.00129	0.10900 ± 0.00034	0.00141 ± 0.00004	0.00084 ± 0.000074	0.000000 ± 0.000037	7.71E-15	100.0	10.09437	323.7 ± 3.4	1.04%
44	2.59616 ± 0.00349	0.21361 ± 0.00059	0.00270 ± 0.00004	0.00065 ± 0.000145	0.000079 ± 0.000017	1.82E-14	99.1	12.04547	380.1 ± 1.4	0.37%

45	1.27387 ± 0.00143	0.11731 ± 0.00042	0.00160 ± 0.00004	0.00607 ± 0.000172	0.000052 ± 0.000019	8.92E-15	98.8	10.73265	342.4 ± 2.0	0.58%
46	1.82613 ± 0.00246	0.18284 ± 0.00047	0.00259 ± 0.00009	0.00147 ± 0.000236	0.000060 ± 0.000017	1.28E-14	99.0	9.89185	317.8 ± 1.3	0.41%
47	2.12521 ± 0.00350	0.21360 ± 0.00071	0.00283 ± 0.00006	0.00026 ± 0.000183	0.000048 ± 0.000019	1.49E-14	99.3	9.88302	317.5 ± 1.5	0.46%
48	1.18830 ± 0.00138	0.11953 ± 0.00035	0.00157 ± 0.00005	0.00009 ± 0.000165	0.000024 ± 0.000020	8.32E-15	99.4	9.88319	317.5 ± 1.9	0.59%
49	1.87862 ± 0.00129	0.12860 ± 0.00039	0.00152 ± 0.00004	0.00033 ± 0.000183	0.000023 ± 0.000020	1.32E-14	99.6	14.55610	450.2 ± 2.0	0.44%
50	1.76852 ± 0.00188	0.15221 ± 0.00045	0.00188 ± 0.00005	0.00001 ± 0.000108	0.000038 ± 0.000020	1.24E-14	99.4	11.54402	365.8 ± 1.7	0.46%
51	1.33576 ± 0.00248	0.10944 ± 0.00039	0.00142 ± 0.00005	0.00017 ± 0.000127	0.000006 ± 0.000019	9.35E-15	99.9	12.18975	384.2 ± 2.2	0.58%
52	0.75044 ± 0.00144	0.07581 ± 0.00025	0.00092 ± 0.00004	-0.00011 ± 0.000215	0.000031 ± 0.000022	5.26E-15	98.8	9.77907	314.5 ± 3.1	0.97%
53	1.16850 ± 0.00125	0.12398 ± 0.00052	0.00158 ± 0.00004	-0.00002 ± 0.000183	-0.000020 ± 0.000031	8.18E-15	100.5	9.42515	304.0 ± 2.8	0.91%
54	1.35358 ± 0.00143	0.13559 ± 0.00023	0.00178 ± 0.00006	0.00033 ± 0.000218	0.000028 ± 0.000020	9.48E-15	99.4	9.92169	318.7 ± 1.5	0.48%
55	1.15593 ± 0.00151	0.11641 ± 0.00039	0.00151 ± 0.00004	0.00028 ± 0.000129	0.000010 ± 0.000020	8.10E-15	99.7	9.90406	318.1 ± 2.0	0.63%
56	1.33752 ± 0.00187	0.13225 ± 0.00037	0.00171 ± 0.00005	0.00022 ± 0.000247	0.000050 ± 0.000019	9.37E-15	98.9	10.00277	321.0 ± 1.7	0.53%
57	0.99143 ± 0.00097	0.08352 ± 0.00041	0.00114 ± 0.00004	0.00018 ± 0.000167	0.000007 ± 0.000016	6.94E-15	99.8	11.84811	374.5 ± 2.6	0.70%
58	0.92780 ± 0.00156	0.07864 ± 0.00043	0.00107 ± 0.00003	-0.00005 ± 0.000145	-0.000012 ± 0.000019	6.50E-15	100.4	11.79727	373.1 ± 3.1	0.84%
59	1.48405 ± 0.00134	0.14865 ± 0.00038	0.00195 ± 0.00005	0.00070 ± 0.000145	0.000015 ± 0.000016	1.04E-14	99.7	9.95354	319.6 ± 1.3	0.42%
60	1.69011 ± 0.00168	0.16877 ± 0.00053	0.00221 ± 0.00004	0.00025 ± 0.000235	0.000027 ± 0.000015	1.18E-14	99.5	9.96696	320.0 ± 1.4	0.43%
61	1.23961 ± 0.00115	0.12329 ± 0.00049	0.00169 ± 0.00005	0.00033 ± 0.000174	-0.000007 ± 0.000019	8.68E-15	100.2	10.05490	322.6 ± 2.0	0.60%
62	1.39072 ± 0.00147	0.12461 ± 0.00032	0.00155 ± 0.00005	0.00131 ± 0.000137	-0.000022 ± 0.000021	9.74E-15	100.5	11.16165	354.8 ± 1.9	0.52%
63	0.39645 ± 0.00089	0.03914 ± 0.00012	0.00044 ± 0.00005	0.00058 ± 0.000208	0.000044 ± 0.000023	2.78E-15	96.7	9.79643	315.0 ± 5.7	1.82%
64	0.92787 ± 0.00064	0.07769 ± 0.00028	0.00100 ± 0.00006	0.00041 ± 0.000193	0.000029 ± 0.000019	6.50E-15	99.1	11.83134	374.0 ± 2.7	0.71%
65	1.23862 ± 0.00167	0.12360 ± 0.00044	0.00171 ± 0.00006	0.00013 ± 0.000121	0.000046 ± 0.000020	8.67E-15	98.9	9.90995	318.3 ± 2.0	0.62%
66	1.46980 ± 0.00117	0.14715 ± 0.00032	0.00192 ± 0.00004	-0.00014 ± 0.000209	0.000003 ± 0.000018	1.03E-14	99.9	9.98124	320.4 ± 1.4	0.43%
67	1.53201 ± 0.00178	0.13201 ± 0.00038	0.00166 ± 0.00005	0.00058 ± 0.000246	0.000025 ± 0.000019	1.07E-14	99.5	11.54944	366.0 ± 1.8	0.49%
68	0.65521 ± 0.00144	0.06563 ± 0.00038	0.00087 ± 0.00003	0.00069 ± 0.000122	0.000019 ± 0.000019	4.59E-15	99.1	9.89772	318.0 ± 3.4	1.08%
69	1.10538 ± 0.00137	0.11118 ± 0.00027	0.00145 ± 0.00003	-0.00007 ± 0.000139	0.000060 ± 0.000017	7.74E-15	98.4	9.78303	314.6 ± 1.7	0.53%
70	0.91358 ± 0.00131	0.06684 ± 0.00030	0.00084 ± 0.00004	0.00003 ± 0.000158	0.000059 ± 0.000019	6.40E-15	98.1	13.40649	418.4 ± 3.3	0.78%
71	1.34453 ± 0.00189	0.13477 ± 0.00049	0.00178 ± 0.00004	0.00005 ± 0.000174	0.000055 ± 0.000017	9.42E-15	98.8	9.85662	316.7 ± 1.7	0.55%
72	0.94670 ± 0.00144	0.09529 ± 0.00031	0.00124 ± 0.00005	0.00041 ± 0.000217	0.000023 ± 0.000021	6.63E-15	99.3	9.86224	316.9 ± 2.4	0.75%
73	0.55585 ± 0.00100	0.05562 ± 0.00043	0.00056 ± 0.00006	0.00012 ± 0.000119	-0.000001 ± 0.000019	3.89E-15	100.1	9.99412	320.8 ± 4.1	1.29%
74	1.24819 ± 0.00140	0.10968 ± 0.00071	0.00142 ± 0.00004	0.00076 ± 0.000163	0.000116 ± 0.000018	8.74E-15	97.3	11.06819	352.1 ± 2.8	0.80%
75	1.82265 ± 0.00165	0.17885 ± 0.00045	0.00232 ± 0.00005	0.00066 ± 0.000170	0.000023 ± 0.000018	1.28E-14	99.6	10.15355	325.5 ± 1.3	0.40%
76	1.43754 ± 0.00177	0.14222 ± 0.00047	0.00189 ± 0.00005	0.00169 ± 0.000180	0.000013 ± 0.000019	1.01E-14	99.8	10.08274	323.4 ± 1.7	0.53%
77	1.69483 ± 0.00137	0.16614 ± 0.00046	0.00214 ± 0.00006	0.00021 ± 0.000198	0.000043 ± 0.000021	1.19E-14	99.2	10.12458	324.6 ± 1.5	0.47%
78	1.91212 ± 0.00282	0.16720 ± 0.00051	0.00218 ± 0.00004	-0.00015 ± 0.000153	0.000039 ± 0.000017	1.34E-14	99.4	11.36730	360.7 ± 1.5	0.43%
79	1.46437 ± 0.00111	0.12301 ± 0.00042	0.00163 ± 0.00004	-0.00004 ± 0.000202	-0.000079 ± 0.000034	1.03E-14	101.6	11.90453	376.1 ± 2.9	0.76%
80	1.07978 ± 0.00168	0.10565 ± 0.00028	0.00130 ± 0.00004	0.00034 ± 0.000221	-0.000015 ± 0.000029	7.56E-15	100.4	10.22019	327.4 ± 2.8	0.85%
81	0.83158 ± 0.00189	0.07265 ± 0.00027	0.00097 ± 0.00004	-0.00005 ± 0.000141	0.000007 ± 0.000018	5.82E-15	99.7	11.41658	362.1 ± 2.8	0.77%
82	0.92819 ± 0.00128	0.08878 ± 0.00033	0.00123 ± 0.00003	0.00014 ± 0.000165	0.000095 ± 0.000020	6.50E-15	97.0	10.14058	325.1 ± 2.5	0.77%
83	2.02798 ± 0.00325	0.18590 ± 0.00071	0.00236 ± 0.00003	0.00003 ± 0.000170	0.000030 ± 0.000021	1.42E-14	99.6	10.86186	346.1 ± 1.8	0.52%

84	1.01226 ± 0.00113	0.10028 ± 0.00061	0.00139 ± 0.00005	0.00036 ± 0.000144	-0.000023 ± 0.000028	7.09E-15	100.7	10.09491	323.8 ± 3.3	1.02%
85	0.82665 ± 0.00169	0.08007 ± 0.00032	0.00108 ± 0.00004	0.00049 ± 0.000189	0.000027 ± 0.000019	5.79E-15	99.0	10.22438	327.6 ± 2.7	0.82%
86	2.24842 ± 0.00264	0.18948 ± 0.00061	0.00249 ± 0.00005	0.00059 ± 0.000149	0.000040 ± 0.000020	1.57E-14	99.5	11.80483	373.3 ± 1.6	0.43%
87	0.92475 ± 0.00164	0.09074 ± 0.00058	0.00119 ± 0.00004	0.00029 ± 0.000202	-0.000024 ± 0.000029	6.48E-15	100.8	10.19144	326.6 ± 3.8	1.15%
88	1.22637 ± 0.00135	0.12064 ± 0.00034	0.00151 ± 0.00005	0.00041 ± 0.000236	0.000006 ± 0.000018	8.59E-15	99.9	10.15110	325.4 ± 1.7	0.54%
89	0.86856 ± 0.00132	0.08595 ± 0.00038	0.00114 ± 0.00004	0.00051 ± 0.000132	0.000049 ± 0.000016	6.08E-15	98.3	9.93609	319.1 ± 2.4	0.74%
90	1.22333 ± 0.00274	0.10401 ± 0.00034	0.00136 ± 0.00005	0.00012 ± 0.000209	-0.000056 ± 0.000038	8.57E-15	101.4	11.76204	372.0 ± 3.8	1.01%
91	1.01699 ± 0.00133	0.10052 ± 0.00071	0.00132 ± 0.00005	0.00017 ± 0.000127	0.000038 ± 0.000020	7.12E-15	98.9	10.00527	321.1 ± 3.0	0.93%
92	1.13942 ± 0.00235	0.11270 ± 0.00042	0.00149 ± 0.00004	0.00071 ± 0.000230	0.000011 ± 0.000018	7.98E-15	99.7	10.08139	323.4 ± 2.0	0.63%
93	4.13276 ± 0.00311	0.35318 ± 0.00141	0.00457 ± 0.00005	0.00074 ± 0.000225	0.000085 ± 0.000021	2.89E-14	99.4	11.63034	368.3 ± 1.6	0.43%
94	1.27603 ± 0.00114	0.12496 ± 0.00063	0.00161 ± 0.00005	0.00050 ± 0.000152	0.000003 ± 0.000021	8.94E-15	99.9	10.20427	327.0 ± 2.3	0.70%
95	1.01771 ± 0.00134	0.10018 ± 0.00040	0.00128 ± 0.00003	0.00048 ± 0.000167	0.000040 ± 0.000021	7.13E-15	98.8	10.04043	322.2 ± 2.4	0.74%
96	0.78576 ± 0.00316	0.07644 ± 0.00049	0.00104 ± 0.00003	0.00020 ± 0.000211	0.000022 ± 0.000018	5.50E-15	99.2	10.19703	326.8 ± 3.4	1.03%
97	1.97933 ± 0.00189	0.19158 ± 0.00054	0.00254 ± 0.00005	-0.00046 ± 0.000247	0.000080 ± 0.000019	1.39E-14	98.8	10.20732	327.1 ± 1.3	0.41%
98	1.60158 ± 0.00172	0.15756 ± 0.00063	0.00208 ± 0.00004	-0.00042 ± 0.000185	0.000076 ± 0.000021	1.12E-14	98.6	10.02152	321.6 ± 1.9	0.58%
99	1.95847 ± 0.00184	0.13404 ± 0.00050	0.00173 ± 0.00005	-0.00041 ± 0.000184	-0.000040 ± 0.000032	1.37E-14	100.6	14.61079	451.7 ± 2.8	0.62%
100	1.19321 ± 0.00134	0.11712 ± 0.00043	0.00166 ± 0.00007	0.00031 ± 0.000122	0.000089 ± 0.000019	8.36E-15	97.8	9.96447	319.9 ± 2.0	0.63%
101	1.62754 ± 0.00201	0.13603 ± 0.00049	0.00173 ± 0.00004	-0.00053 ± 0.000101	0.000081 ± 0.000019	1.14E-14	98.5	11.78691	372.8 ± 2.0	0.53%
102	1.88376 ± 0.00244	0.13768 ± 0.00043	0.00184 ± 0.00005	0.00056 ± 0.000201	0.000057 ± 0.000016	1.32E-14	99.1	13.56043	422.7 ± 1.8	0.43%
103	0.85361 ± 0.00127	0.08233 ± 0.00024	0.00118 ± 0.00005	0.00093 ± 0.000184	0.000091 ± 0.000017	5.98E-15	96.8	10.04058	322.2 ± 2.2	0.69%
104	1.20328 ± 0.00094	0.11862 ± 0.00034	0.00168 ± 0.00004	-0.00017 ± 0.000274	-0.000015 ± 0.000018	8.43E-15	100.4	10.14410	325.2 ± 1.8	0.54%
105	1.08523 ± 0.00119	0.10699 ± 0.00055	0.00155 ± 0.00004	0.00102 ± 0.000181	0.000025 ± 0.000015	7.60E-15	99.3	10.07642	323.2 ± 2.2	0.67%
106	1.78940 ± 0.00198	0.14983 ± 0.00042	0.00197 ± 0.00005	0.00079 ± 0.000233	0.000073 ± 0.000017	1.25E-14	98.8	11.79981	373.1 ± 1.5	0.42%
107	4.66744 ± 0.00298	0.14473 ± 0.00040	0.00194 ± 0.00006	-0.00024 ± 0.000244	-0.000006 ± 0.000017	3.27E-14	100.0	32.24866	879.2 ± 2.7	0.30%
108	0.91637 ± 0.00145	0.08115 ± 0.00033	0.00103 ± 0.00004	0.00012 ± 0.000157	-0.000006 ± 0.000019	6.42E-15	100.2	11.29305	358.6 ± 2.7	0.75%
109	1.85945 ± 0.00212	0.18288 ± 0.00083	0.00235 ± 0.00004	-0.00010 ± 0.000173	-0.000008 ± 0.000019	1.30E-14	100.1	10.16731	325.9 ± 1.8	0.56%
110	1.20947 ± 0.00204	0.12154 ± 0.00055	0.00144 ± 0.00003	-0.00005 ± 0.000147	0.000020 ± 0.000018	8.47E-15	99.5	9.90186	318.1 ± 2.1	0.65%
111	1.22089 ± 0.00168	0.12189 ± 0.00066	0.00154 ± 0.00004	-0.00037 ± 0.000172	-0.000021 ± 0.000020	8.55E-15	100.5	10.01597	321.4 ± 2.4	0.75%
112	1.25862 ± 0.00340	0.10677 ± 0.00086	0.00139 ± 0.00005	0.00020 ± 0.000192	0.000054 ± 0.000018	8.81E-15	98.7	11.63768	368.5 ± 3.6	0.97%

au21.1j.mus (BRK 1708) Mitchell Moore *j=0.019472±0.000018 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
1	11.43503 ± 0.00706	0.79340 ± 0.00166	0.01005 ± 0.00005	0.00187 ± 0.000056	0.000227 ± 0.000026	8.01E-14	99.4	14.32848	444.0 ± 1.0	0.23%
2	7.22474 ± 0.00781	0.61700 ± 0.00071	0.00814 ± 0.00004	0.00074 ± 0.000072	0.000296 ± 0.000024	5.06E-14	98.8	11.56800	366.5 ± 0.7	0.19%
3	1.98992 ± 0.00288	0.13942 ± 0.00054	0.00176 ± 0.00003	0.00018 ± 0.000048	0.000008 ± 0.000013	1.39E-14	99.9	14.25667	442.0 ± 2.0	0.46%
4	3.79441 ± 0.00397	0.26256 ± 0.00038	0.00339 ± 0.00005	0.00024 ± 0.000052	0.000112 ± 0.000014	2.66E-14	99.1	14.32586	443.9 ± 0.9	0.21%
5	8.71352 ± 0.00421	0.60301 ± 0.00150	0.00765 ± 0.00005	0.00035 ± 0.000048	0.000122 ± 0.000019	6.10E-14	99.6	14.39000	445.6 ± 1.2	0.26%

6	3.49282 ± 0.00618	0.24141 ± 0.00041	0.00309 ± 0.00004	0.00105 ± 0.000069	0.000000 ± 0.000018	2.45E-14	100.0	14.46864	447.8 ± 1.3	0.29%
7	9.46309 ± 0.00517	0.65705 ± 0.00169	0.00857 ± 0.00005	0.00100 ± 0.000052	0.000181 ± 0.000014	6.63E-14	99.4	14.32101	443.7 ± 1.2	0.27%
8	6.24564 ± 0.00794	0.43587 ± 0.00080	0.00562 ± 0.00007	0.00228 ± 0.000063	0.000177 ± 0.000022	4.37E-14	99.2	14.20985	440.7 ± 1.1	0.25%
9	5.39557 ± 0.00902	0.37160 ± 0.00068	0.00485 ± 0.00007	0.00047 ± 0.000048	0.000043 ± 0.000020	3.78E-14	99.8	14.48595	448.3 ± 1.2	0.27%
10	5.10070 ± 0.00599	0.35571 ± 0.00080	0.00462 ± 0.00006	0.00078 ± 0.000045	0.000067 ± 0.000021	3.57E-14	99.6	14.28389	442.7 ± 1.3	0.28%
11	3.79269 ± 0.00227	0.31820 ± 0.00113	0.00411 ± 0.00005	0.00113 ± 0.000049	0.000147 ± 0.000024	2.66E-14	98.9	11.78360	372.7 ± 1.5	0.41%
12	5.62369 ± 0.00503	0.39201 ± 0.00069	0.00507 ± 0.00005	0.00064 ± 0.000054	0.000062 ± 0.000013	3.94E-14	99.7	14.29911	443.1 ± 0.9	0.21%
13	4.05356 ± 0.00311	0.29865 ± 0.00058	0.00390 ± 0.00005	0.01072 ± 0.000150	0.000353 ± 0.000029	2.84E-14	97.4	13.22709	413.4 ± 1.3	0.30%
14	10.70695 ± 0.01162	0.74386 ± 0.00132	0.00957 ± 0.00009	0.00354 ± 0.000086	0.000192 ± 0.000031	7.50E-14	99.5	14.31816	443.7 ± 1.0	0.23%
15	6.06987 ± 0.00694	0.47031 ± 0.00069	0.00596 ± 0.00004	0.00046 ± 0.000039	0.000029 ± 0.000023	4.25E-14	99.9	12.88760	403.9 ± 0.9	0.22%
16	2.61756 ± 0.00277	0.22807 ± 0.00063	0.00296 ± 0.00004	0.00025 ± 0.000036	0.000199 ± 0.000024	1.83E-14	97.8	11.21978	356.5 ± 1.5	0.41%
17	3.52846 ± 0.00237	0.27561 ± 0.00062	0.00358 ± 0.00004	0.00025 ± 0.000046	0.000275 ± 0.000026	2.47E-14	97.7	12.50776	393.2 ± 1.3	0.33%
18	6.19753 ± 0.00555	0.44309 ± 0.00097	0.00563 ± 0.00007	0.00208 ± 0.000057	0.000171 ± 0.000026	4.34E-14	99.2	13.87351	431.4 ± 1.2	0.27%
19	3.04031 ± 0.00207	0.21445 ± 0.00066	0.00274 ± 0.00006	0.00115 ± 0.000067	0.000054 ± 0.000022	2.13E-14	99.5	14.10336	437.8 ± 1.7	0.38%
20	4.04404 ± 0.00325	0.29883 ± 0.00101	0.00389 ± 0.00006	0.00102 ± 0.000042	0.000228 ± 0.000023	2.83E-14	98.3	13.30813	415.7 ± 1.6	0.39%
21	3.24769 ± 0.00303	0.28217 ± 0.00073	0.00364 ± 0.00004	0.00208 ± 0.000073	0.000089 ± 0.000013	2.27E-14	99.2	11.41750	362.2 ± 1.1	0.30%
22	13.33238 ± 0.01734	0.93461 ± 0.00187	0.01262 ± 0.00019	0.00659 ± 0.000107	0.000255 ± 0.000029	9.34E-14	99.4	14.18530	440.0 ± 1.1	0.25%
23	1.41818 ± 0.00179	0.11974 ± 0.00020	0.00149 ± 0.00004	0.00037 ± 0.000069	0.000011 ± 0.000024	9.93E-15	99.8	11.81553	373.6 ± 2.0	0.53%
24	3.52396 ± 0.00361	0.24213 ± 0.00105	0.00311 ± 0.00006	0.00096 ± 0.000068	0.000224 ± 0.000022	2.47E-14	98.1	14.28136	442.7 ± 2.2	0.49%
25	1.56479 ± 0.00152	0.10779 ± 0.00048	0.00140 ± 0.00003	0.00012 ± 0.000050	-0.000004 ± 0.000018	1.10E-14	100.1	14.51651	449.1 ± 2.6	0.57%
26	5.01264 ± 0.00380	0.34932 ± 0.00075	0.00456 ± 0.00006	0.00248 ± 0.000069	0.000088 ± 0.000019	3.51E-14	99.5	14.27562	442.5 ± 1.1	0.26%
27	0.63712 ± 0.00092	0.05623 ± 0.00021	0.00069 ± 0.00003	0.00067 ± 0.000057	0.000002 ± 0.000019	4.46E-15	99.9	11.31982	359.4 ± 3.4	0.96%
28	3.18670 ± 0.00303	0.21957 ± 0.00044	0.00283 ± 0.00004	0.00154 ± 0.000037	0.000044 ± 0.000022	2.23E-14	99.6	14.45451	447.4 ± 1.4	0.31%
29	3.83478 ± 0.00486	0.26454 ± 0.00053	0.00333 ± 0.00006	0.00062 ± 0.000066	0.000148 ± 0.000012	2.69E-14	98.9	14.33031	444.0 ± 1.1	0.26%
30	6.19357 ± 0.00565	0.43032 ± 0.00085	0.00549 ± 0.00005	0.00083 ± 0.000060	0.000110 ± 0.000022	4.34E-14	99.5	14.31736	443.6 ± 1.1	0.24%
31	2.52196 ± 0.00179	0.18593 ± 0.00049	0.00237 ± 0.00003	0.00013 ± 0.000067	0.000089 ± 0.000028	1.77E-14	99.0	13.42198	418.9 ± 1.8	0.44%
32	2.27132 ± 0.00242	0.17397 ± 0.00076	0.00230 ± 0.00004	0.00035 ± 0.000034	0.000098 ± 0.000028	1.59E-14	98.7	12.88999	404.0 ± 2.3	0.58%
33	5.85048 ± 0.00595	0.44824 ± 0.00083	0.00609 ± 0.00011	0.00136 ± 0.000074	0.000212 ± 0.000035	4.10E-14	98.9	12.91283	404.6 ± 1.1	0.28%
34	1.87809 ± 0.00292	0.16248 ± 0.00058	0.00210 ± 0.00003	0.00027 ± 0.000054	0.000033 ± 0.000030	1.32E-14	99.5	11.49854	364.5 ± 2.2	0.61%
35	0.67510 ± 0.00095	0.05920 ± 0.00022	0.00077 ± 0.00003	0.00024 ± 0.000053	0.000023 ± 0.000028	4.73E-15	99.0	11.29065	358.5 ± 4.7	1.31%
36	9.14487 ± 0.00728	0.62695 ± 0.00116	0.00817 ± 0.00007	0.00616 ± 0.000099	0.000353 ± 0.000025	6.40E-14	98.9	14.42084	446.5 ± 1.0	0.22%
37	6.79813 ± 0.00733	0.47623 ± 0.00087	0.00650 ± 0.00012	0.00365 ± 0.000090	0.000147 ± 0.000023	4.76E-14	99.4	14.18419	440.0 ± 1.0	0.24%
38	2.19871 ± 0.00185	0.18787 ± 0.00067	0.00243 ± 0.00005	0.00148 ± 0.000041	0.000011 ± 0.000013	1.54E-14	99.9	11.68616	369.9 ± 1.5	0.41%
39	4.46222 ± 0.00443	0.30927 ± 0.00090	0.00399 ± 0.00005	0.00148 ± 0.000058	0.000080 ± 0.000018	3.13E-14	99.5	14.35253	444.6 ± 1.5	0.33%
40	1.75011 ± 0.00270	0.12007 ± 0.00039	0.00156 ± 0.00003	0.00038 ± 0.000045	0.000034 ± 0.000022	1.23E-14	99.4	14.49290	448.5 ± 2.3	0.52%
41	4.83646 ± 0.00310	0.33855 ± 0.00096	0.00435 ± 0.00004	0.01084 ± 0.000145	0.000057 ± 0.000028	3.39E-14	99.7	14.23876	441.5 ± 1.5	0.34%
42	9.07128 ± 0.00804	0.64201 ± 0.00180	0.00833 ± 0.00005	0.00100 ± 0.000055	0.000208 ± 0.000022	6.35E-14	99.3	14.03393	435.8 ± 1.3	0.30%
43	3.87675 ± 0.00650	0.31070 ± 0.00104	0.00393 ± 0.00006	0.00044 ± 0.000046	0.000134 ± 0.000023	2.72E-14	99.0	12.34994	388.8 ± 1.6	0.42%
44	2.01845 ± 0.00365	0.17776 ± 0.00063	0.00228 ± 0.00004	0.00023 ± 0.000053	0.000165 ± 0.000026	1.41E-14	97.6	11.08016	352.5 ± 2.0	0.56%

45	1.28105 ± 0.00221	0.11411 ± 0.00041	0.00144 ± 0.00002	0.00172 ± 0.000060	0.000006 ± 0.000026	8.97E-15	99.9	11.21215	356.3 ± 2.6	0.72%
46	6.87990 ± 0.00627	0.60641 ± 0.00162	0.00777 ± 0.00007	0.00071 ± 0.000046	0.000413 ± 0.000032	4.82E-14	98.2	11.14408	354.3 ± 1.1	0.32%
47	2.17598 ± 0.00299	0.15236 ± 0.00042	0.00192 ± 0.00003	0.00026 ± 0.000062	0.000018 ± 0.000019	1.52E-14	99.8	14.24613	441.7 ± 1.8	0.40%
48	2.12444 ± 0.00256	0.14827 ± 0.00045	0.00186 ± 0.00004	0.00037 ± 0.000063	0.000026 ± 0.000014	1.49E-14	99.6	14.27758	442.6 ± 1.7	0.38%
49	3.17954 ± 0.00489	0.22050 ± 0.00048	0.00290 ± 0.00003	0.00144 ± 0.000040	0.000087 ± 0.000029	2.23E-14	99.2	14.30361	443.3 ± 1.7	0.38%
50	2.97205 ± 0.00251	0.20433 ± 0.00064	0.00260 ± 0.00004	0.00032 ± 0.000049	0.000149 ± 0.000021	2.08E-14	98.5	14.32960	444.0 ± 1.7	0.39%
51	10.69243 ± 0.04622	0.74314 ± 0.00384	0.00950 ± 0.00010	0.00201 ± 0.000048	0.000164 ± 0.000038	7.49E-14	99.5	14.32302	443.8 ± 3.0	0.69%
52	1.48815 ± 0.00168	0.11755 ± 0.00041	0.00150 ± 0.00004	-0.00011 ± 0.000063	0.000027 ± 0.000024	1.04E-14	99.5	12.59141	395.6 ± 2.4	0.60%
53	3.14417 ± 0.00486	0.24902 ± 0.00085	0.00318 ± 0.00005	-0.00014 ± 0.000048	0.000107 ± 0.000022	2.20E-14	99.0	12.49898	393.0 ± 1.7	0.43%
54	4.26737 ± 0.01974	0.29100 ± 0.00133	0.00383 ± 0.00005	0.00044 ± 0.000099	0.000335 ± 0.000029	2.99E-14	97.7	14.32475	443.8 ± 3.1	0.70%
55	4.57976 ± 0.01873	0.31425 ± 0.00064	0.00407 ± 0.00007	0.00127 ± 0.000063	-0.000009 ± 0.000012	3.21E-14	100.1	14.57395	450.7 ± 2.1	0.46%
56	2.67668 ± 0.01034	0.21074 ± 0.00090	0.00276 ± 0.00003	0.00064 ± 0.000063	0.000127 ± 0.000023	1.87E-14	98.6	12.52359	393.7 ± 2.5	0.64%
57	9.02967 ± 0.01120	0.62795 ± 0.00170	0.00814 ± 0.00006	0.00057 ± 0.000056	0.000123 ± 0.000026	6.32E-14	99.6	14.32191	443.8 ± 1.4	0.31%
58	5.30127 ± 0.00438	0.36849 ± 0.00104	0.00489 ± 0.00005	0.00016 ± 0.000062	0.000163 ± 0.000015	3.71E-14	99.1	14.25547	441.9 ± 1.4	0.31%
59	1.82227 ± 0.00221	0.15479 ± 0.00036	0.00204 ± 0.00003	0.00010 ± 0.000081	0.000064 ± 0.000019	1.28E-14	99.0	11.65039	368.9 ± 1.5	0.41%
60	2.21114 ± 0.00273	0.17414 ± 0.00032	0.00223 ± 0.00005	0.00024 ± 0.000051	0.000117 ± 0.000018	1.55E-14	98.4	12.49837	393.0 ± 1.3	0.33%
61	2.11940 ± 0.00242	0.14839 ± 0.00067	0.00188 ± 0.00003	0.00171 ± 0.000076	0.000082 ± 0.000018	1.48E-14	98.9	14.12096	438.2 ± 2.3	0.53%
62	11.27514 ± 0.01061	0.77776 ± 0.00257	0.01005 ± 0.00009	0.00236 ± 0.000075	0.000283 ± 0.000019	7.90E-14	99.3	14.38973	445.6 ± 1.6	0.35%
63	0.80034 ± 0.00062	0.07002 ± 0.00011	0.00094 ± 0.00003	0.00087 ± 0.000064	0.000026 ± 0.000013	5.61E-15	99.1	11.32249	359.4 ± 1.9	0.52%
64	2.97273 ± 0.00329	0.20354 ± 0.00051	0.00265 ± 0.00004	0.00014 ± 0.000042	0.000108 ± 0.000014	2.08E-14	98.9	14.44894	447.3 ± 1.4	0.31%
65	0.26585 ± 0.00041	0.01835 ± 0.00011	0.00022 ± 0.00003	-0.00009 ± 0.000037	0.000000 ± 0.000013	1.86E-15	99.9	14.48322	448.2 ± 7.0	1.57%
66	2.53578 ± 0.00249	0.17468 ± 0.00056	0.00222 ± 0.00004	0.00037 ± 0.000070	0.000075 ± 0.000013	1.78E-14	99.1	14.38983	445.6 ± 1.7	0.38%
67	3.02706 ± 0.00502	0.23587 ± 0.00080	0.00297 ± 0.00004	0.00204 ± 0.000110	0.000053 ± 0.000011	2.12E-14	99.5	12.76812	400.6 ± 1.6	0.40%
68	5.37135 ± 0.00339	0.37687 ± 0.00105	0.00487 ± 0.00005	0.00184 ± 0.000042	0.000047 ± 0.000011	3.76E-14	99.7	14.21631	440.9 ± 1.3	0.29%
69	2.40043 ± 0.00279	0.16458 ± 0.00052	0.00216 ± 0.00004	0.00156 ± 0.000068	0.000030 ± 0.000023	1.68E-14	99.6	14.53213	449.5 ± 2.0	0.44%
70	1.86053 ± 0.00187	0.13049 ± 0.00053	0.00173 ± 0.00004	0.00051 ± 0.000061	0.000049 ± 0.000011	1.30E-14	99.2	14.14762	439.0 ± 2.0	0.45%
71	2.18897 ± 0.00262	0.15223 ± 0.00044	0.00183 ± 0.00007	0.00041 ± 0.000052	0.000019 ± 0.000021	1.53E-14	99.7	14.34240	444.3 ± 1.9	0.42%
72	3.56641 ± 0.00615	0.25849 ± 0.00037	0.00337 ± 0.00003	0.00006 ± 0.000045	-0.000044 ± 0.000022	2.50E-14	100.4	13.79728	429.3 ± 1.2	0.29%
73	0.63741 ± 0.00094	0.05153 ± 0.00021	0.00063 ± 0.00002	0.00196 ± 0.000081	0.000015 ± 0.000011	4.46E-15	99.3	12.28735	387.0 ± 2.5	0.65%
74	4.03356 ± 0.00323	0.30647 ± 0.00067	0.00396 ± 0.00007	0.00033 ± 0.000046	0.000036 ± 0.000014	2.82E-14	99.7	13.12682	410.6 ± 1.0	0.25%
75	0.34539 ± 0.00066	0.02693 ± 0.00014	0.00034 ± 0.00003	0.00021 ± 0.000099	0.000007 ± 0.000010	2.42E-15	99.4	12.74802	400.0 ± 4.2	1.05%
76	1.43451 ± 0.00118	0.10052 ± 0.00054	0.00130 ± 0.00004	0.00055 ± 0.000051	0.000044 ± 0.000012	1.00E-14	99.1	14.14134	438.8 ± 2.6	0.60%
77	1.80699 ± 0.00267	0.16161 ± 0.00060	0.00205 ± 0.00005	0.00024 ± 0.000050	0.000048 ± 0.000017	1.27E-14	99.2	11.09282	352.8 ± 1.7	0.49%
78	1.57610 ± 0.00241	0.13573 ± 0.00036	0.00174 ± 0.00004	0.00087 ± 0.000060	0.000114 ± 0.000010	1.10E-14	97.9	11.36468	360.7 ± 1.3	0.37%
79	9.25408 ± 0.00966	0.63971 ± 0.00120	0.00833 ± 0.00006	0.00089 ± 0.000092	0.000176 ± 0.000013	6.48E-14	99.4	14.38474	445.5 ± 1.0	0.22%
80	3.34198 ± 0.00212	0.23227 ± 0.00048	0.00301 ± 0.00006	0.00355 ± 0.000078	0.000192 ± 0.000012	2.34E-14	98.3	14.14597	438.9 ± 1.1	0.25%
81	2.55100 ± 0.00430	0.17990 ± 0.00087	0.00241 ± 0.00004	0.00034 ± 0.000061	0.000081 ± 0.000013	1.79E-14	99.1	14.04639	436.2 ± 2.3	0.54%
82	1.70414 ± 0.00229	0.14482 ± 0.00075	0.00192 ± 0.00002	0.00055 ± 0.000043	0.000153 ± 0.000014	1.19E-14	97.4	11.45587	363.3 ± 2.2	0.61%
83	4.25793 ± 0.00297	0.29608 ± 0.00100	0.00395 ± 0.00006	0.00035 ± 0.000058	0.000033 ± 0.000014	2.98E-14	99.8	14.34843	444.5 ± 1.6	0.36%

84	1.34179 ± 0.00196	0.10577 ± 0.00041	0.00148 ± 0.00004	0.00117 ± 0.000053	0.000050 ± 0.000014	9.40E-15	98.9	12.54754	394.4 ± 2.0	0.52%
85	2.71319 ± 0.00399	0.18785 ± 0.00093	0.00240 ± 0.00003	0.00030 ± 0.000057	0.000032 ± 0.000013	1.90E-14	99.7	14.39300	445.7 ± 2.4	0.54%
86	1.07384 ± 0.00200	0.07328 ± 0.00019	0.00095 ± 0.00004	0.00030 ± 0.000043	0.000035 ± 0.000011	7.52E-15	99.0	14.51293	449.0 ± 2.0	0.45%
87	0.72797 ± 0.00125	0.06152 ± 0.00016	0.00083 ± 0.00003	0.00027 ± 0.000080	-0.000019 ± 0.000019	5.10E-15	100.8	11.83346	374.1 ± 3.1	0.83%
88	3.17404 ± 0.00428	0.21653 ± 0.00085	0.00275 ± 0.00004	0.00060 ± 0.000079	0.000036 ± 0.000013	2.22E-14	99.7	14.61046	451.7 ± 2.0	0.43%
89	8.08802 ± 0.01035	0.08960 ± 0.00023	0.00118 ± 0.00003	0.00014 ± 0.000036	0.000015 ± 0.000013	5.66E-14	99.9	90.21653	1829.4 ± 5.4	0.29%
90	2.98448 ± 0.00599	0.20781 ± 0.00062	0.00266 ± 0.00005	0.00015 ± 0.000068	0.000017 ± 0.000023	2.09E-14	99.8	14.33726	444.2 ± 1.9	0.42%
91	1.46063 ± 0.00241	0.12112 ± 0.00029	0.00161 ± 0.00005	0.00782 ± 0.000112	0.000133 ± 0.000023	1.02E-14	97.4	11.74053	371.4 ± 2.1	0.56%
92	2.65786 ± 0.00153	0.18530 ± 0.00066	0.00242 ± 0.00004	0.01690 ± 0.000348	0.000058 ± 0.000022	1.86E-14	99.4	14.25953	442.1 ± 1.9	0.44%
93	2.23102 ± 0.00249	0.15386 ± 0.00043	0.00199 ± 0.00002	0.00143 ± 0.000050	0.000156 ± 0.000022	1.56E-14	97.9	14.20265	440.5 ± 1.9	0.43%
94	4.50476 ± 0.00423	0.32382 ± 0.00064	0.00417 ± 0.00006	0.00415 ± 0.000089	0.000323 ± 0.000022	3.15E-14	97.9	13.61780	424.3 ± 1.1	0.27%
95	0.82663 ± 0.00106	0.07084 ± 0.00018	0.00093 ± 0.00002	0.00731 ± 0.000108	0.000008 ± 0.000026	5.79E-15	99.8	11.64561	368.7 ± 3.6	0.98%
96	2.30761 ± 0.00228	0.19140 ± 0.00050	0.00244 ± 0.00003	0.00188 ± 0.000065	0.000076 ± 0.000015	1.62E-14	99.0	11.93964	377.1 ± 1.3	0.34%
97	4.84708 ± 0.00590	0.34329 ± 0.00088	0.00448 ± 0.00005	0.00080 ± 0.000037	0.000167 ± 0.000015	3.39E-14	99.0	13.97608	434.2 ± 1.3	0.30%
98	4.77114 ± 0.00387	0.33359 ± 0.00085	0.00432 ± 0.00006	0.00036 ± 0.000054	0.000041 ± 0.000014	3.34E-14	99.7	14.26566	442.2 ± 1.2	0.28%
99	3.83279 ± 0.00342	0.27328 ± 0.00047	0.00350 ± 0.00007	0.00057 ± 0.000088	0.000095 ± 0.000016	2.68E-14	99.3	13.92259	432.8 ± 1.0	0.23%
100	2.25902 ± 0.00235	0.15898 ± 0.00028	0.00203 ± 0.00004	0.00011 ± 0.000060	0.000041 ± 0.000014	1.58E-14	99.5	14.13353	438.6 ± 1.2	0.27%
101	3.21350 ± 0.00268	0.22313 ± 0.00084	0.00292 ± 0.00004	0.00136 ± 0.000083	0.000082 ± 0.000013	2.25E-14	99.3	14.29487	443.0 ± 1.8	0.40%
102	0.96064 ± 0.00183	0.07857 ± 0.00035	0.00101 ± 0.00002	0.00018 ± 0.000056	0.000013 ± 0.000013	6.73E-15	99.6	12.18028	384.0 ± 2.4	0.64%
103	2.86218 ± 0.00299	0.20032 ± 0.00031	0.00265 ± 0.00004	0.00026 ± 0.000038	0.000146 ± 0.000014	2.00E-14	98.5	14.07285	436.9 ± 1.1	0.24%
104	2.28419 ± 0.00471	0.18718 ± 0.00032	0.00237 ± 0.00003	0.00151 ± 0.000082	0.000051 ± 0.000014	1.60E-14	99.3	12.12374	382.4 ± 1.2	0.33%
105	0.17190 ± 0.00037	0.01368 ± 0.00015	0.00018 ± 0.00003	0.00268 ± 0.000098	-0.000022 ± 0.000013	1.20E-15	103.9	12.58472	395.4 ± 10.0	2.52%
106	3.74611 ± 0.00372	0.31664 ± 0.00078	0.00411 ± 0.00004	0.00112 ± 0.000036	0.000121 ± 0.000017	2.62E-14	99.0	11.71779	370.8 ± 1.1	0.30%
107	2.47811 ± 0.00228	0.17533 ± 0.00041	0.00227 ± 0.00004	0.00230 ± 0.000057	0.000128 ± 0.000013	1.74E-14	98.5	13.91836	432.7 ± 1.3	0.30%
108	1.16844 ± 0.00198	0.09870 ± 0.00051	0.00129 ± 0.00003	0.00020 ± 0.000030	0.000056 ± 0.000019	8.18E-15	98.6	11.67162	369.5 ± 2.7	0.73%
109	1.72578 ± 0.00184	0.11631 ± 0.00040	0.00153 ± 0.00003	0.00014 ± 0.000038	0.000173 ± 0.000022	1.21E-14	97.0	14.39851	445.9 ± 2.4	0.53%
110	1.70702 ± 0.00084	0.11979 ± 0.00047	0.00163 ± 0.00004	0.00023 ± 0.000038	0.000040 ± 0.000023	1.20E-14	99.3	14.15286	439.1 ± 2.5	0.56%
111	1.56347 ± 0.00159	0.12382 ± 0.00055	0.00155 ± 0.00003	0.00033 ± 0.000083	0.000006 ± 0.000022	1.09E-14	99.9	12.61384	396.2 ± 2.4	0.62%

au21.1a.mus (BRK 1914) Mitchell Moore *j=0.019472±0.000018 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
1	17.40069 ± 0.01878	1.22159 ± 0.00169	0.01576 ± 0.00009	0.00990 ± 0.000064	0.000228 ± 0.000021	1.22E-13	99.6	14.18990	440.1 ± 0.8	0.18%
2	17.32099 ± 0.00772	1.20012 ± 0.00217	0.01548 ± 0.00015	0.00208 ± 0.000060	0.000008 ± 0.000034	1.21E-13	100.0	14.43090	446.8 ± 0.9	0.19%
3	17.39188 ± 0.01305	1.21188 ± 0.00198	0.01641 ± 0.00017	0.06983 ± 0.000501	0.000271 ± 0.000019	1.22E-13	99.6	14.29070	442.9 ± 0.8	0.18%
4	19.95512 ± 0.01847	1.37658 ± 0.00118	0.01791 ± 0.00012	0.00435 ± 0.000071	0.000337 ± 0.000022	1.40E-13	99.5	14.42420	446.6 ± 0.6	0.13%
5	13.82983 ± 0.00764	0.95635 ± 0.00147	0.01236 ± 0.00015	0.00122 ± 0.000064	0.000220 ± 0.000021	9.69E-14	99.5	14.39310	445.7 ± 0.8	0.17%
6	10.07051 ± 0.00673	0.70186 ± 0.00152	0.00889 ± 0.00006	0.00106 ± 0.000071	0.000066 ± 0.000027	7.05E-14	99.8	14.32060	443.7 ± 1.1	0.24%
7	9.65765 ± 0.00832	0.66852 ± 0.00191	0.00864 ± 0.00006	0.00446 ± 0.000058	0.000160 ± 0.000016	6.76E-14	99.5	14.37620	445.3 ± 1.4	0.30%

8	6.42516 ± 0.00572	0.44197 ± 0.00065	0.00568 ± 0.00005	0.00649 ± 0.000116	0.000241 ± 0.000016	4.50E-14	98.9	14.37810	445.3 ± 0.8	0.19%
9	9.58650 ± 0.01255	0.66416 ± 0.00169	0.00844 ± 0.00009	0.00193 ± 0.000063	0.000045 ± 0.000018	6.71E-14	99.9	14.41420	446.3 ± 1.3	0.29%
10	17.46306 ± 0.01858	1.40618 ± 0.00183	0.01852 ± 0.00026	0.00157 ± 0.000060	0.000667 ± 0.000025	1.22E-13	98.9	12.27860	386.8 ± 0.7	0.18%
11	13.59173 ± 0.01241	0.94314 ± 0.00192	0.01213 ± 0.00010	0.00193 ± 0.000046	0.000133 ± 0.000021	9.52E-14	99.7	14.36950	445.1 ± 1.0	0.23%
12	6.19975 ± 0.00771	0.42850 ± 0.00143	0.00573 ± 0.00011	0.00039 ± 0.000096	0.000171 ± 0.000014	4.34E-14	99.2	14.35040	444.6 ± 1.6	0.36%
13	6.26158 ± 0.00665	0.43489 ± 0.00097	0.00581 ± 0.00008	0.00505 ± 0.000041	0.000181 ± 0.000016	4.39E-14	99.2	14.27600	442.5 ± 1.2	0.26%
14	7.07111 ± 0.00447	0.48711 ± 0.00078	0.00621 ± 0.00007	0.00169 ± 0.000045	0.000111 ± 0.000014	4.95E-14	99.5	14.44930	447.3 ± 0.8	0.18%
15	4.88356 ± 0.00705	0.38157 ± 0.00106	0.00497 ± 0.00005	0.00028 ± 0.000046	0.000137 ± 0.000017	3.42E-14	99.2	12.69280	398.5 ± 1.3	0.33%
16	5.11973 ± 0.00470	0.35537 ± 0.00078	0.00459 ± 0.00003	0.00027 ± 0.000045	0.000101 ± 0.000014	3.59E-14	99.4	14.32300	443.8 ± 1.1	0.25%
17	8.99835 ± 0.00450	0.63162 ± 0.00092	0.00807 ± 0.00006	0.00060 ± 0.000055	0.000294 ± 0.000014	6.30E-14	99.0	14.10900	437.9 ± 0.7	0.16%
18	6.01520 ± 0.00391	0.49435 ± 0.00074	0.00646 ± 0.00008	0.04842 ± 0.000252	0.000164 ± 0.000014	4.21E-14	99.3	12.07920	381.1 ± 0.7	0.18%
19	8.82383 ± 0.00654	0.61411 ± 0.00163	0.00767 ± 0.00007	0.00289 ± 0.000070	0.000075 ± 0.000013	6.18E-14	99.8	14.33260	444.1 ± 1.2	0.28%
20	8.44648 ± 0.01370	0.59135 ± 0.00198	0.00759 ± 0.00006	0.00115 ± 0.000068	0.000047 ± 0.000014	5.92E-14	99.8	14.26020	442.1 ± 1.7	0.38%
21	10.39730 ± 0.00645	0.72550 ± 0.00124	0.00924 ± 0.00007	0.00219 ± 0.000091	0.000105 ± 0.000016	7.28E-14	99.7	14.28860	442.9 ± 0.8	0.19%
22	6.39142 ± 0.00739	0.45015 ± 0.00054	0.00607 ± 0.00013	0.00042 ± 0.000042	-0.000016 ± 0.000016	4.48E-14	100.1	14.19840	440.4 ± 0.8	0.18%
23	4.44788 ± 0.00605	0.30495 ± 0.00068	0.00422 ± 0.00011	0.00289 ± 0.000081	0.000289 ± 0.000012	3.11E-14	98.1	14.30640	443.3 ± 1.2	0.28%
24	4.43234 ± 0.00392	0.30367 ± 0.00117	0.00390 ± 0.00005	0.00011 ± 0.000045	0.000115 ± 0.000010	3.10E-14	99.2	14.48410	448.2 ± 1.8	0.41%
25	3.28322 ± 0.00315	0.22920 ± 0.00055	0.00302 ± 0.00004	0.00874 ± 0.000083	0.000017 ± 0.000019	2.30E-14	99.9	14.30660	443.3 ± 1.4	0.31%
26	7.00034 ± 0.00677	0.48594 ± 0.00131	0.00626 ± 0.00006	0.00026 ± 0.000051	0.000088 ± 0.000012	4.90E-14	99.6	14.35230	444.6 ± 1.3	0.29%
27	3.10635 ± 0.00233	0.21460 ± 0.00055	0.00279 ± 0.00005	0.00028 ± 0.000053	0.000134 ± 0.000015	2.18E-14	98.7	14.29050	442.9 ± 1.4	0.31%
28	5.95391 ± 0.00639	0.51346 ± 0.00047	0.00647 ± 0.00007	0.00029 ± 0.000078	0.000055 ± 0.000014	4.17E-14	99.7	11.56380	366.4 ± 0.6	0.16%
29	2.50524 ± 0.00308	0.17387 ± 0.00050	0.00217 ± 0.00005	0.00016 ± 0.000059	-0.000002 ± 0.000016	1.75E-14	100.0	14.40880	446.2 ± 1.6	0.36%
30	9.12976 ± 0.01020	0.63509 ± 0.00133	0.00815 ± 0.00007	0.00043 ± 0.000040	0.000074 ± 0.000014	6.39E-14	99.8	14.34110	444.3 ± 1.1	0.24%
31	4.37638 ± 0.00493	0.30306 ± 0.00085	0.00392 ± 0.00005	0.00028 ± 0.000079	0.000111 ± 0.000014	3.06E-14	99.3	14.33260	444.1 ± 1.4	0.32%
32	1.91734 ± 0.00210	0.13200 ± 0.00064	0.00172 ± 0.00004	0.00037 ± 0.000045	-0.000017 ± 0.000012	1.34E-14	100.3	14.52530	449.3 ± 2.4	0.53%
33	5.09451 ± 0.00203	0.35490 ± 0.00054	0.00492 ± 0.00012	0.00050 ± 0.000038	0.000027 ± 0.000014	3.57E-14	99.8	14.33220	444.1 ± 0.8	0.18%
34	11.20903 ± 0.01071	0.81531 ± 0.00128	0.01071 ± 0.00006	0.00246 ± 0.000066	0.000154 ± 0.000022	7.85E-14	99.6	13.69280	426.4 ± 0.8	0.19%
35	13.97028 ± 0.01089	0.97610 ± 0.00124	0.01243 ± 0.00008	0.00918 ± 0.000080	0.000306 ± 0.000023	9.78E-14	99.4	14.22080	441.0 ± 0.7	0.16%
36	6.00932 ± 0.00653	0.42428 ± 0.00065	0.00536 ± 0.00006	0.00027 ± 0.000066	0.000045 ± 0.000024	4.21E-14	99.8	14.13230	438.6 ± 1.0	0.22%
37	6.00851 ± 0.00653	0.42425 ± 0.00065	0.00536 ± 0.00006	0.00027 ± 0.000066	0.000059 ± 0.000024	4.21E-14	99.7	14.12170	438.3 ± 1.0	0.22%
38	4.44223 ± 0.00459	0.30703 ± 0.00065	0.00394 ± 0.00004	0.00019 ± 0.000050	0.000036 ± 0.000015	3.11E-14	99.8	14.43380	446.8 ± 1.2	0.26%
39	2.62895 ± 0.00369	0.22634 ± 0.00065	0.00283 ± 0.00005	0.00015 ± 0.000071	0.000049 ± 0.000015	1.84E-14	99.5	11.55160	366.0 ± 1.3	0.37%
40	13.34218 ± 0.00981	0.91779 ± 0.00200	0.01180 ± 0.00010	0.00125 ± 0.000075	0.000075 ± 0.000045	9.34E-14	99.8	14.51330	449.0 ± 1.1	0.25%
41	4.41450 ± 0.00287	0.31377 ± 0.00057	0.00406 ± 0.00004	0.00480 ± 0.000083	0.000123 ± 0.000016	3.09E-14	99.2	13.95470	433.7 ± 1.0	0.22%
42	6.82547 ± 0.01045	0.47001 ± 0.00106	0.00601 ± 0.00007	0.00969 ± 0.000148	0.000262 ± 0.000016	4.78E-14	98.9	14.35930	444.8 ± 1.3	0.28%
43	10.37062 ± 0.00446	0.75544 ± 0.00108	0.00966 ± 0.00004	0.00786 ± 0.000109	0.000135 ± 0.000022	7.26E-14	99.6	13.67610	425.9 ± 0.7	0.16%
44	4.96335 ± 0.00509	0.34208 ± 0.00073	0.00449 ± 0.00004	0.00099 ± 0.000041	0.000126 ± 0.000014	3.48E-14	99.3	14.40130	445.9 ± 1.1	0.25%
45	3.46914 ± 0.00188	0.29409 ± 0.00051	0.00377 ± 0.00006	0.00238 ± 0.000111	0.000075 ± 0.000017	2.43E-14	99.4	11.72180	370.9 ± 0.9	0.23%
46	5.01435 ± 0.00540	0.34373 ± 0.00129	0.00442 ± 0.00004	0.00489 ± 0.000090	0.000204 ± 0.000017	3.51E-14	98.8	14.41390	446.3 ± 1.8	0.41%

47	3.27098 ± 0.00798	0.22886 ± 0.00080	0.00294 ± 0.00005	0.00035 ± 0.000067	0.000058 ± 0.000025	2.29E-14	99.5	14.21820	440.9 ± 2.1	0.48%
48	10.12155 ± 0.01043	0.70688 ± 0.00103	0.00946 ± 0.00009	0.00085 ± 0.000049	0.000105 ± 0.000016	7.09E-14	99.7	14.27500	442.5 ± 0.8	0.18%
49	10.77063 ± 0.01321	0.76067 ± 0.00188	0.00974 ± 0.00008	0.00101 ± 0.000080	0.000125 ± 0.000020	7.54E-14	99.7	14.11080	438.0 ± 1.2	0.28%
50	6.95702 ± 0.00864	0.48433 ± 0.00109	0.00628 ± 0.00008	0.00029 ± 0.000034	0.000136 ± 0.000015	4.87E-14	99.4	14.28120	442.7 ± 1.2	0.27%
51	8.21681 ± 0.00509	0.57160 ± 0.00091	0.00728 ± 0.00006	0.00045 ± 0.000053	0.000100 ± 0.000017	5.75E-14	99.6	14.32360	443.8 ± 0.8	0.18%
52	7.76086 ± 0.00945	0.53923 ± 0.00156	0.00696 ± 0.00008	0.00139 ± 0.000077	0.000126 ± 0.000015	5.44E-14	99.5	14.32380	443.8 ± 1.4	0.32%
53	3.11519 ± 0.00427	0.21514 ± 0.00069	0.00279 ± 0.00004	0.00034 ± 0.000045	0.000137 ± 0.000028	2.18E-14	98.7	14.29120	442.9 ± 2.0	0.44%
54	4.42281 ± 0.00647	0.30462 ± 0.00085	0.00416 ± 0.00011	0.00025 ± 0.000033	0.000120 ± 0.000034	3.10E-14	99.2	14.40250	446.0 ± 1.7	0.39%
55	5.14678 ± 0.00439	0.36313 ± 0.00062	0.00482 ± 0.00006	0.00026 ± 0.000051	0.000084 ± 0.000028	3.60E-14	99.5	14.10490	437.8 ± 1.1	0.25%
56	3.64631 ± 0.00602	0.25437 ± 0.00084	0.00320 ± 0.00003	0.00020 ± 0.000035	0.000095 ± 0.000028	2.55E-14	99.2	14.22450	441.1 ± 1.9	0.43%
57	3.25778 ± 0.00402	0.22429 ± 0.00082	0.00288 ± 0.00004	0.00021 ± 0.000052	0.000107 ± 0.000028	2.28E-14	99.0	14.38370	445.5 ± 2.1	0.46%
58	5.57838 ± 0.00495	0.47709 ± 0.00165	0.00615 ± 0.00005	0.00045 ± 0.000059	0.000111 ± 0.000014	3.91E-14	99.4	11.62390	368.1 ± 1.3	0.37%
59	5.19912 ± 0.00689	0.36627 ± 0.00086	0.00469 ± 0.00005	0.00029 ± 0.000068	0.000028 ± 0.000014	3.64E-14	99.8	14.17200	439.6 ± 1.2	0.28%
60	6.17637 ± 0.00914	0.43428 ± 0.00123	0.00586 ± 0.00012	0.00122 ± 0.000086	0.000089 ± 0.000015	4.33E-14	99.6	14.16150	439.4 ± 1.4	0.33%
61	3.43174 ± 0.00609	0.26717 ± 0.00067	0.00339 ± 0.00003	0.00046 ± 0.000059	0.000069 ± 0.000015	2.40E-14	99.4	12.76850	400.6 ± 1.3	0.34%
62	1.80915 ± 0.00182	0.15820 ± 0.00054	0.00206 ± 0.00005	0.00028 ± 0.000063	0.000106 ± 0.000013	1.27E-14	98.3	11.23870	357.0 ± 1.5	0.42%
63	1.80999 ± 0.00320	0.14160 ± 0.00060	0.00186 ± 0.00004	0.00262 ± 0.000073	0.000077 ± 0.000015	1.27E-14	98.8	12.62300	396.5 ± 2.1	0.53%
64	2.55464 ± 0.00414	0.20591 ± 0.00082	0.00273 ± 0.00003	0.00811 ± 0.000126	0.000145 ± 0.000015	1.79E-14	98.4	12.20230	384.6 ± 1.8	0.47%
65	4.78583 ± 0.00525	0.33330 ± 0.00087	0.00438 ± 0.00005	0.00091 ± 0.000053	0.000076 ± 0.000015	3.35E-14	99.5	14.29180	442.9 ± 1.3	0.30%
66	1.79213 ± 0.00253	0.12443 ± 0.00051	0.00164 ± 0.00003	0.00032 ± 0.000049	0.000027 ± 0.000014	1.26E-14	99.6	14.33900	444.2 ± 2.2	0.49%
67	2.36893 ± 0.00267	0.16136 ± 0.00029	0.00209 ± 0.00005	0.00043 ± 0.000053	0.000098 ± 0.000012	1.66E-14	98.8	14.50130	448.7 ± 1.2	0.27%
68	1.48580 ± 0.00178	0.11863 ± 0.00019	0.00152 ± 0.00004	0.00011 ± 0.000049	0.000094 ± 0.000016	1.04E-14	98.1	12.29080	387.1 ± 1.5	0.38%
69	2.56781 ± 0.00312	0.17867 ± 0.00036	0.00243 ± 0.00006	0.00355 ± 0.000076	0.000076 ± 0.000014	1.80E-14	99.1	14.24850	441.8 ± 1.3	0.29%
70	3.22374 ± 0.00263	0.22588 ± 0.00068	0.00279 ± 0.00004	0.00016 ± 0.000057	0.000045 ± 0.000013	2.26E-14	99.6	14.21310	440.8 ± 1.5	0.33%
71	3.11976 ± 0.00296	0.21653 ± 0.00061	0.00281 ± 0.00005	0.00065 ± 0.000060	0.000077 ± 0.000015	2.18E-14	99.3	14.30390	443.3 ± 1.5	0.33%
72	2.27136 ± 0.00275	0.15882 ± 0.00078	0.00205 ± 0.00004	0.00016 ± 0.000026	-0.000015 ± 0.000024	1.59E-14	100.2	14.30170	443.2 ± 2.6	0.60%
73	2.39698 ± 0.00302	0.19437 ± 0.00071	0.00253 ± 0.00006	0.00009 ± 0.000045	0.000071 ± 0.000016	1.68E-14	99.1	12.22390	385.2 ± 1.7	0.44%
74	1.39872 ± 0.00165	0.09703 ± 0.00023	0.00126 ± 0.00004	0.00010 ± 0.000057	0.000045 ± 0.000016	9.80E-15	99.1	14.28010	442.6 ± 2.0	0.44%
75	3.14306 ± 0.00416	0.22138 ± 0.00059	0.00282 ± 0.00004	0.00021 ± 0.000047	0.000063 ± 0.000016	2.20E-14	99.4	14.11300	438.0 ± 1.5	0.34%
76	4.54294 ± 0.00197	0.31426 ± 0.00085	0.00401 ± 0.00003	0.00209 ± 0.000068	0.000160 ± 0.000015	3.18E-14	99.0	14.30650	443.3 ± 1.3	0.30%
77	1.41908 ± 0.00151	0.09765 ± 0.00036	0.00127 ± 0.00004	0.00297 ± 0.000070	0.000056 ± 0.000016	9.94E-15	98.9	14.36700	445.0 ± 2.2	0.51%
78	2.07031 ± 0.00241	0.16510 ± 0.00037	0.00218 ± 0.00006	0.00042 ± 0.000067	-0.000008 ± 0.000023	1.45E-14	100.1	12.53970	394.1 ± 1.6	0.41%
79	4.31763 ± 0.00365	0.29946 ± 0.00106	0.00383 ± 0.00004	0.00030 ± 0.000036	0.000042 ± 0.000012	3.02E-14	99.7	14.37700	445.3 ± 1.7	0.37%
80	5.41501 ± 0.00708	0.38069 ± 0.00057	0.00489 ± 0.00004	0.00029 ± 0.000052	0.000043 ± 0.000011	3.79E-14	99.8	14.19080	440.2 ± 0.9	0.21%
81	5.32558 ± 0.00496	0.44383 ± 0.00103	0.00607 ± 0.00005	0.00167 ± 0.000077	0.000098 ± 0.000014	3.73E-14	99.5	11.93430	377.0 ± 1.0	0.26%
82	1.98964 ± 0.00214	0.15500 ± 0.00058	0.00219 ± 0.00007	0.00022 ± 0.000051	0.000168 ± 0.000015	1.39E-14	97.5	12.51680	393.5 ± 1.8	0.46%
83	2.71280 ± 0.00315	0.18650 ± 0.00069	0.00241 ± 0.00004	0.00038 ± 0.000056	0.000013 ± 0.000012	1.90E-14	99.9	14.52560	449.4 ± 1.9	0.41%
84	2.92308 ± 0.00374	0.20264 ± 0.00040	0.00264 ± 0.00005	0.00046 ± 0.000067	0.000126 ± 0.000014	2.05E-14	98.7	14.24220	441.6 ± 1.2	0.28%
85	1.93529 ± 0.00197	0.15136 ± 0.00042	0.00197 ± 0.00003	0.00078 ± 0.000060	0.000059 ± 0.000015	1.36E-14	99.1	12.67140	397.9 ± 1.5	0.37%

86	4.45285 ± 0.00300	0.30597 ± 0.00102	0.00406 ± 0.00006	0.00058 ± 0.000047	0.000024 ± 0.000015	3.12E-14	99.8	14.52990	449.5 ± 1.6	0.35%
87	1.66932 ± 0.00173	0.11450 ± 0.00047	0.00152 ± 0.00002	0.00214 ± 0.000058	0.000047 ± 0.000014	1.17E-14	99.2	14.45850	447.5 ± 2.2	0.49%
88	2.05851 ± 0.00172	0.15524 ± 0.00054	0.00200 ± 0.00005	0.00039 ± 0.000046	0.000014 ± 0.000013	1.44E-14	99.8	13.23470	413.7 ± 1.7	0.41%
89	0.54365 ± 0.00096	0.04858 ± 0.00021	0.00057 ± 0.00003	0.00006 ± 0.000049	0.000000 ± 0.000012	3.81E-15	100.0	11.19090	355.6 ± 2.9	0.81%
90	2.40049 ± 0.00182	0.16773 ± 0.00035	0.00216 ± 0.00004	0.00017 ± 0.000035	0.000029 ± 0.000015	1.68E-14	99.6	14.26050	442.1 ± 1.3	0.29%
91	2.61239 ± 0.00221	0.18340 ± 0.00063	0.00230 ± 0.00003	0.00027 ± 0.000061	0.000022 ± 0.000014	1.83E-14	99.8	14.20930	440.7 ± 1.7	0.39%
92	2.87873 ± 0.00237	0.25647 ± 0.00113	0.00331 ± 0.00007	0.00401 ± 0.000092	0.000041 ± 0.000012	2.02E-14	99.6	11.17890	355.3 ± 1.7	0.47%
93	1.01284 ± 0.00155	0.08862 ± 0.00033	0.00119 ± 0.00004	0.00012 ± 0.000062	0.000017 ± 0.000012	7.09E-15	99.5	11.37300	360.9 ± 1.9	0.53%
94	8.93747 ± 0.00487	0.62233 ± 0.00087	0.00796 ± 0.00006	0.00053 ± 0.000073	0.000164 ± 0.000016	6.26E-14	99.5	14.28360	442.7 ± 0.7	0.16%
95	1.92055 ± 0.00246	0.13287 ± 0.00035	0.00186 ± 0.00007	0.00020 ± 0.000055	0.000007 ± 0.000012	1.35E-14	99.9	14.43830	447.0 ± 1.6	0.35%
96	1.23243 ± 0.00205	0.08508 ± 0.00037	0.00112 ± 0.00004	0.00007 ± 0.000076	-0.000002 ± 0.000014	8.63E-15	100.0	14.48520	448.2 ± 2.6	0.57%
97	2.86954 ± 0.00268	0.19810 ± 0.00068	0.00255 ± 0.00004	0.00089 ± 0.000049	-0.000001 ± 0.000025	2.01E-14	100.0	14.48570	448.3 ± 2.0	0.44%
98	0.66745 ± 0.00084	0.05927 ± 0.00041	0.00068 ± 0.00004	0.00004 ± 0.000037	-0.000065 ± 0.000024	4.67E-15	102.9	11.26050	357.7 ± 4.6	1.28%
99	0.65085 ± 0.00123	0.04447 ± 0.00020	0.00053 ± 0.00003	0.00004 ± 0.000044	0.000008 ± 0.000014	4.56E-15	99.6	14.58130	450.9 ± 3.6	0.81%
100	0.56763 ± 0.00078	0.03923 ± 0.00016	0.00044 ± 0.00004	0.00001 ± 0.000042	-0.000004 ± 0.000014	3.98E-15	100.2	14.46840	447.8 ± 3.8	0.86%
101	0.18684 ± 0.00052	0.01311 ± 0.00012	0.00009 ± 0.00003	-0.00006 ± 0.000058	0.000005 ± 0.000015	1.31E-15	99.2	14.12700	438.4 ± 11.3	2.59%
102	0.24466 ± 0.00059	0.02008 ± 0.00008	0.00024 ± 0.00002	-0.00007 ± 0.000060	-0.000052 ± 0.000023	1.71E-15	106.3	12.18300	384.0 ± 10.7	2.78%
103	0.70490 ± 0.00092	0.04888 ± 0.00021	0.00060 ± 0.00002	-0.00010 ± 0.000044	-0.000035 ± 0.000019	4.94E-15	101.5	14.41940	446.4 ± 4.1	0.92%
104	1.60031 ± 0.00129	0.11136 ± 0.00034	0.00141 ± 0.00003	0.00014 ± 0.000056	0.000019 ± 0.000016	1.12E-14	99.7	14.32070	443.7 ± 1.9	0.43%
105	2.25100 ± 0.00251	0.15554 ± 0.00049	0.00197 ± 0.00004	0.00027 ± 0.000057	-0.000009 ± 0.000029	1.58E-14	100.1	14.47230	447.9 ± 2.3	0.51%
106	4.31254 ± 0.00495	0.30012 ± 0.00101	0.00386 ± 0.00006	0.00060 ± 0.000098	0.000135 ± 0.000014	3.02E-14	99.1	14.23650	441.4 ± 1.6	0.37%
107	4.24021 ± 0.00420	0.29685 ± 0.00088	0.00370 ± 0.00004	0.00032 ± 0.000056	0.000083 ± 0.000016	2.97E-14	99.4	14.20190	440.5 ± 1.5	0.33%
108	3.33057 ± 0.00415	0.24823 ± 0.00068	0.00306 ± 0.00003	0.00062 ± 0.000038	0.000052 ± 0.000016	2.33E-14	99.5	13.35590	417.0 ± 1.4	0.33%
109	3.87080 ± 0.00496	0.26918 ± 0.00081	0.00340 ± 0.00007	0.00096 ± 0.000075	0.000047 ± 0.000026	2.71E-14	99.6	14.32890	444.0 ± 1.7	0.38%
110	4.53025 ± 0.00308	0.31491 ± 0.00031	0.00398 ± 0.00005	0.00024 ± 0.000048	0.000078 ± 0.000015	3.17E-14	99.5	14.31230	443.5 ± 0.7	0.15%
111	3.62696 ± 0.00228	0.25314 ± 0.00070	0.00330 ± 0.00005	0.00046 ± 0.000041	0.000107 ± 0.000014	2.54E-14	99.1	14.20350	440.5 ± 1.4	0.31%

au21.1e.mus (BRK 1971) Mitchell Moore *j=0.019472±0.000018 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
1	7.70390 ± 0.00505	0.56429 ± 0.00125	0.00726 ± 0.00005	0.00028 ± 0.000051	0.000122 ± 0.000016	5.40E-14	99.5	13.58873	423.5 ± 1.0	0.24%
2	3.62078 ± 0.00155	0.30324 ± 0.00028	0.00406 ± 0.00009	0.00073 ± 0.000056	-0.000024 ± 0.000023	2.54E-14	100.2	11.94052	377.1 ± 0.8	0.21%
3	6.44751 ± 0.00691	0.44415 ± 0.00060	0.00578 ± 0.00006	0.00009 ± 0.000049	0.000259 ± 0.000016	4.52E-14	98.8	14.34415	444.4 ± 0.8	0.19%
4	2.19841 ± 0.00250	0.20016 ± 0.00048	0.00270 ± 0.00004	0.00035 ± 0.000062	0.000117 ± 0.000015	1.54E-14	98.4	10.81073	344.6 ± 1.2	0.33%
5	7.35663 ± 0.00635	0.62042 ± 0.00115	0.00826 ± 0.00013	0.00029 ± 0.000070	0.000038 ± 0.000019	5.15E-14	99.8	11.83960	374.3 ± 0.8	0.22%
6	2.66752 ± 0.00110	0.19878 ± 0.00035	0.00258 ± 0.00004	0.00028 ± 0.000054	0.000006 ± 0.000013	1.87E-14	99.9	13.41141	418.6 ± 1.0	0.23%
7	5.68699 ± 0.00911	0.39354 ± 0.00118	0.00511 ± 0.00005	0.00020 ± 0.000045	0.000046 ± 0.000013	3.98E-14	99.8	14.41655	446.4 ± 1.5	0.35%
8	2.76453 ± 0.00311	0.24374 ± 0.00070	0.00310 ± 0.00006	0.00000 ± 0.000044	0.000025 ± 0.000012	1.94E-14	99.7	11.31151	359.1 ± 1.2	0.33%
9	2.53246 ± 0.00261	0.17260 ± 0.00033	0.00224 ± 0.00003	0.00005 ± 0.000037	0.000160 ± 0.000012	1.77E-14	98.1	14.39876	445.9 ± 1.2	0.26%

10	2.40048 ± 0.00154	0.20446 ± 0.00081	0.00263 ± 0.00004	0.00001 ± 0.000047	0.000045 ± 0.000012	1.68E-14	99.4	11.67559	369.6 ± 1.6	0.43%
11	6.66639 ± 0.00604	0.46190 ± 0.00055	0.00587 ± 0.00007	0.00009 ± 0.000050	0.000155 ± 0.000016	4.67E-14	99.3	14.33325	444.1 ± 0.7	0.17%
12	3.12895 ± 0.00299	0.27250 ± 0.00072	0.00352 ± 0.00004	0.00014 ± 0.000032	0.000108 ± 0.000013	2.19E-14	99.0	11.36575	360.7 ± 1.1	0.31%
13	4.63575 ± 0.00231	0.33697 ± 0.00057	0.00434 ± 0.00004	0.00157 ± 0.000090	0.000120 ± 0.000013	3.25E-14	99.2	13.65254	425.3 ± 0.8	0.20%
14	4.75495 ± 0.00372	0.39334 ± 0.00065	0.00504 ± 0.00009	0.00278 ± 0.000084	0.000091 ± 0.000016	3.33E-14	99.4	12.02112	379.4 ± 0.8	0.21%
15	7.25784 ± 0.00622	0.50363 ± 0.00088	0.00639 ± 0.00004	0.00028 ± 0.000071	0.000091 ± 0.000014	5.08E-14	99.6	14.35777	444.8 ± 0.9	0.20%
16	6.61200 ± 0.00419	0.49069 ± 0.00091	0.00635 ± 0.00008	-0.00004 ± 0.000057	0.000081 ± 0.000014	4.63E-14	99.6	13.42608	419.0 ± 0.9	0.21%
17	3.96573 ± 0.00310	0.32918 ± 0.00087	0.00424 ± 0.00004	0.00039 ± 0.000061	0.000015 ± 0.000015	2.78E-14	99.9	12.03342	379.8 ± 1.1	0.30%
18	6.71080 ± 0.00496	0.23069 ± 0.00039	0.00307 ± 0.00005	0.00055 ± 0.000074	0.000021 ± 0.000016	4.70E-14	99.9	29.06288	809.1 ± 1.6	0.20%
19	1.40470 ± 0.00216	0.13771 ± 0.00049	0.00178 ± 0.00004	0.00019 ± 0.000049	0.000065 ± 0.000016	9.84E-15	98.6	10.06168	322.8 ± 1.7	0.52%
20	2.49373 ± 0.00181	0.16960 ± 0.00027	0.00215 ± 0.00003	0.00027 ± 0.000058	0.000025 ± 0.000016	1.75E-14	99.7	14.66017	453.0 ± 1.2	0.26%
21	3.43789 ± 0.00199	0.23383 ± 0.00040	0.00305 ± 0.00004	0.00022 ± 0.000057	0.000054 ± 0.000015	2.41E-14	99.5	14.63454	452.3 ± 1.0	0.22%
22	2.00267 ± 0.00315	0.16754 ± 0.00054	0.00206 ± 0.00003	0.00008 ± 0.000043	-0.000018 ± 0.000021	1.40E-14	100.3	11.95314	377.5 ± 1.8	0.48%
23	3.71225 ± 0.00344	0.25881 ± 0.00082	0.00328 ± 0.00005	0.00009 ± 0.000055	0.000106 ± 0.000013	2.60E-14	99.2	14.22265	441.0 ± 1.5	0.35%
24	2.52089 ± 0.00174	0.24903 ± 0.00067	0.00304 ± 0.00006	0.00027 ± 0.000048	0.000040 ± 0.000013	1.77E-14	99.5	10.07491	323.2 ± 1.0	0.32%
25	2.32830 ± 0.00332	0.16721 ± 0.00051	0.00211 ± 0.00004	0.00019 ± 0.000066	0.000046 ± 0.000012	1.63E-14	99.4	13.84277	430.6 ± 1.6	0.37%
26	2.78862 ± 0.00356	0.19564 ± 0.00049	0.00248 ± 0.00005	0.00010 ± 0.000039	0.000006 ± 0.000021	1.95E-14	99.9	14.24553	441.7 ± 1.6	0.36%
27	1.73945 ± 0.00111	0.12357 ± 0.00042	0.00154 ± 0.00004	0.00006 ± 0.000033	0.000001 ± 0.000027	1.22E-14	100.0	14.07425	437.0 ± 2.5	0.58%
28	2.41852 ± 0.00269	0.16865 ± 0.00051	0.00225 ± 0.00005	0.00245 ± 0.000062	0.000042 ± 0.000019	1.69E-14	99.5	14.26781	442.3 ± 1.7	0.40%
29	2.32020 ± 0.00127	0.20118 ± 0.00043	0.00249 ± 0.00003	0.00155 ± 0.000046	0.000092 ± 0.000033	1.62E-14	98.8	11.39803	361.6 ± 1.8	0.49%
30	3.22440 ± 0.00316	0.26630 ± 0.00061	0.00340 ± 0.00005	0.00267 ± 0.000066	0.000087 ± 0.000030	2.26E-14	99.2	12.01281	379.2 ± 1.4	0.37%
31	4.77185 ± 0.00412	0.32446 ± 0.00043	0.00413 ± 0.00006	0.00016 ± 0.000059	0.000167 ± 0.000028	3.34E-14	99.0	14.55494	450.2 ± 1.1	0.24%
32	5.16299 ± 0.00345	0.35765 ± 0.00051	0.00466 ± 0.00003	0.00064 ± 0.000064	0.000126 ± 0.000029	3.62E-14	99.3	14.33199	444.0 ± 1.0	0.23%
33	3.00978 ± 0.00309	0.20823 ± 0.00088	0.00266 ± 0.00006	0.00000 ± 0.000074	0.000119 ± 0.000027	2.11E-14	98.8	14.28582	442.8 ± 2.3	0.52%
34	1.13377 ± 0.00063	0.09586 ± 0.00050	0.00126 ± 0.00005	0.00004 ± 0.000059	0.000072 ± 0.000027	7.94E-15	98.1	11.60431	367.5 ± 3.3	0.89%
35	3.01931 ± 0.00226	0.21123 ± 0.00098	0.00271 ± 0.00003	0.00012 ± 0.000061	0.000048 ± 0.000025	2.11E-14	99.5	14.22671	441.2 ± 2.3	0.53%
36	4.98303 ± 0.00507	0.41542 ± 0.00075	0.00544 ± 0.00006	0.00027 ± 0.000059	0.000079 ± 0.000029	3.49E-14	99.5	11.93899	377.1 ± 1.0	0.27%
37	2.79210 ± 0.00247	0.22995 ± 0.00088	0.00293 ± 0.00005	0.00027 ± 0.000053	0.000060 ± 0.000017	1.96E-14	99.4	12.06553	380.7 ± 1.7	0.43%
38	3.74820 ± 0.00327	0.32853 ± 0.00085	0.00428 ± 0.00007	0.00029 ± 0.000027	-0.000020 ± 0.000022	2.62E-14	100.2	11.40902	361.9 ± 1.2	0.32%
39	3.12588 ± 0.00346	0.26931 ± 0.00038	0.00344 ± 0.00004	0.00064 ± 0.000056	0.000016 ± 0.000027	2.19E-14	99.8	11.58957	367.1 ± 1.2	0.32%
40	3.22285 ± 0.00240	0.22260 ± 0.00073	0.00288 ± 0.00004	0.00057 ± 0.000093	0.000019 ± 0.000024	2.26E-14	99.8	14.45391	447.4 ± 1.8	0.40%
41	3.13284 ± 0.00244	0.30875 ± 0.00067	0.00394 ± 0.00006	0.00022 ± 0.000039	0.000049 ± 0.000013	2.19E-14	99.5	10.09971	323.9 ± 0.9	0.27%
42	3.30036 ± 0.00396	0.28226 ± 0.00085	0.00366 ± 0.00004	0.00028 ± 0.000049	-0.000024 ± 0.000024	2.31E-14	100.2	11.69288	370.1 ± 1.4	0.39%
43	3.56384 ± 0.00294	0.24526 ± 0.00060	0.00314 ± 0.00005	0.00027 ± 0.000074	0.000115 ± 0.000021	2.50E-14	99.1	14.39299	445.7 ± 1.4	0.32%
44	1.53474 ± 0.00187	0.13385 ± 0.00034	0.00170 ± 0.00003	0.00034 ± 0.000065	0.000017 ± 0.000014	1.07E-14	99.7	11.42905	362.5 ± 1.4	0.40%
45	5.76241 ± 0.00424	0.38971 ± 0.00079	0.00498 ± 0.00005	0.00010 ± 0.000048	0.000220 ± 0.000026	4.04E-14	98.9	14.61947	451.9 ± 1.2	0.26%
46	2.47657 ± 0.00310	0.17050 ± 0.00037	0.00213 ± 0.00002	0.00010 ± 0.000056	0.000010 ± 0.000023	1.73E-14	99.9	14.50772	448.9 ± 1.7	0.37%
47	2.03173 ± 0.00138	0.19766 ± 0.00051	0.00248 ± 0.00004	0.00016 ± 0.000066	0.000136 ± 0.000027	1.42E-14	98.0	10.07502	323.2 ± 1.6	0.49%
48	4.18794 ± 0.00517	0.30665 ± 0.00084	0.00394 ± 0.00004	0.00014 ± 0.000030	0.000153 ± 0.000035	2.93E-14	98.9	13.51011	421.3 ± 1.7	0.39%

49	1.61071 ± 0.00200	0.14053 ± 0.00041	0.00185 ± 0.00003	0.00018 ± 0.000058	0.000086 ± 0.000032	1.13E-14	98.4	11.28157	358.3 ± 2.4	0.67%
50	3.56701 ± 0.00239	0.30856 ± 0.00087	0.00393 ± 0.00005	0.00011 ± 0.000056	0.000069 ± 0.000035	2.50E-14	99.4	11.49443	364.4 ± 1.5	0.42%
51	3.70389 ± 0.00279	0.29787 ± 0.00097	0.00377 ± 0.00005	0.00013 ± 0.000052	0.000070 ± 0.000031	2.59E-14	99.4	12.36557	389.2 ± 1.6	0.42%
52	1.70523 ± 0.00239	0.14846 ± 0.00041	0.00203 ± 0.00005	0.00011 ± 0.000045	0.000018 ± 0.000021	1.19E-14	99.7	11.45057	363.1 ± 1.7	0.48%
53	1.15167 ± 0.00123	0.11361 ± 0.00051	0.00144 ± 0.00003	0.00040 ± 0.000086	0.000050 ± 0.000020	8.07E-15	98.7	10.00608	321.1 ± 2.2	0.70%
54	1.08833 ± 0.00139	0.09429 ± 0.00025	0.00119 ± 0.00004	0.00026 ± 0.000068	0.000015 ± 0.000013	7.62E-15	99.6	11.49627	364.4 ± 1.7	0.47%
55	3.35850 ± 0.00438	0.27508 ± 0.00075	0.00341 ± 0.00005	0.00018 ± 0.000067	0.000021 ± 0.000026	2.35E-14	99.8	12.18623	384.1 ± 1.5	0.38%
56	1.31185 ± 0.00159	0.09162 ± 0.00040	0.00116 ± 0.00004	0.00003 ± 0.000056	0.000012 ± 0.000015	9.19E-15	99.7	14.27979	442.6 ± 2.5	0.56%
57	1.85180 ± 0.00126	0.15445 ± 0.00041	0.00199 ± 0.00004	0.00009 ± 0.000045	-0.000006 ± 0.000012	1.30E-14	100.1	11.98947	378.5 ± 1.3	0.33%
58	2.09400 ± 0.00226	0.14890 ± 0.00041	0.00190 ± 0.00004	-0.00020 ± 0.000053	0.000007 ± 0.000013	1.47E-14	99.9	14.05003	436.3 ± 1.5	0.35%
59	2.13570 ± 0.00101	0.18765 ± 0.00045	0.00221 ± 0.00009	0.00001 ± 0.000056	0.000005 ± 0.000014	1.50E-14	99.9	11.37415	360.9 ± 1.1	0.31%
60	2.08941 ± 0.00097	0.14324 ± 0.00037	0.00178 ± 0.00004	0.00029 ± 0.000066	-0.000050 ± 0.000021	1.46E-14	100.7	14.58727	451.0 ± 1.8	0.40%
61	3.17611 ± 0.00461	0.27184 ± 0.00083	0.00348 ± 0.00005	0.00015 ± 0.000041	0.000017 ± 0.000013	2.22E-14	99.8	11.66486	369.3 ± 1.3	0.36%
62	2.46005 ± 0.00190	0.23170 ± 0.00083	0.00301 ± 0.00004	0.00009 ± 0.000064	0.000248 ± 0.000018	1.72E-14	97.0	10.30172	329.8 ± 1.4	0.44%
63	3.91188 ± 0.00374	0.27648 ± 0.00075	0.00379 ± 0.00007	0.00017 ± 0.000064	0.000080 ± 0.000012	2.74E-14	99.4	14.06342	436.7 ± 1.3	0.30%
64	1.28036 ± 0.00185	0.09017 ± 0.00049	0.00118 ± 0.00003	-0.00004 ± 0.000054	0.000002 ± 0.000012	8.97E-15	99.9	14.19092	440.2 ± 2.8	0.63%
65	2.85618 ± 0.00329	0.23836 ± 0.00044	0.00304 ± 0.00006	0.00020 ± 0.000068	0.000054 ± 0.000012	2.00E-14	99.4	11.91632	376.5 ± 0.9	0.25%
66	2.90321 ± 0.00166	0.19705 ± 0.00073	0.00258 ± 0.00005	0.00021 ± 0.000038	0.000017 ± 0.000014	2.03E-14	99.8	14.70726	454.3 ± 1.8	0.40%
67	3.59646 ± 0.00337	0.26899 ± 0.00086	0.00348 ± 0.00005	0.00010 ± 0.000051	0.000109 ± 0.000018	2.52E-14	99.1	13.25013	414.1 ± 1.5	0.37%
68	4.43890 ± 0.00397	0.30087 ± 0.00072	0.00394 ± 0.00006	0.00014 ± 0.000042	0.000168 ± 0.000021	3.11E-14	98.9	14.58872	451.1 ± 1.3	0.29%
69	1.72067 ± 0.00309	0.12051 ± 0.00039	0.00155 ± 0.00003	0.00024 ± 0.000049	0.000034 ± 0.000017	1.21E-14	99.4	14.19553	440.3 ± 2.1	0.47%
70	1.58664 ± 0.00127	0.11003 ± 0.00027	0.00135 ± 0.00003	0.00019 ± 0.000048	0.000028 ± 0.000016	1.11E-14	99.5	14.34420	444.4 ± 1.8	0.40%
71	2.79714 ± 0.00156	0.27730 ± 0.00049	0.00356 ± 0.00004	0.00022 ± 0.000067	0.000033 ± 0.000018	1.96E-14	99.6	10.05150	322.5 ± 0.8	0.26%
72	1.38850 ± 0.00241	0.12141 ± 0.00043	0.00161 ± 0.00003	0.00018 ± 0.000064	0.000045 ± 0.000016	9.72E-15	99.0	11.32674	359.6 ± 1.9	0.53%
73	1.82754 ± 0.00301	0.15946 ± 0.00056	0.00203 ± 0.00005	0.00068 ± 0.000049	0.000024 ± 0.000014	1.28E-14	99.6	11.41660	362.1 ± 1.6	0.45%
74	2.53972 ± 0.00239	0.21398 ± 0.00054	0.00279 ± 0.00004	0.00022 ± 0.000035	0.000222 ± 0.000015	1.78E-14	97.4	11.56258	366.3 ± 1.2	0.33%
75	4.08080 ± 0.00291	0.35474 ± 0.00063	0.00450 ± 0.00005	0.00022 ± 0.000080	-0.000039 ± 0.000028	2.86E-14	100.3	11.50373	364.6 ± 1.0	0.28%
76	4.37684 ± 0.00410	0.32813 ± 0.00068	0.00439 ± 0.00007	0.00022 ± 0.000050	0.000002 ± 0.000016	3.07E-14	100.0	13.33732	416.5 ± 1.0	0.25%
77	2.64297 ± 0.00289	0.21320 ± 0.00063	0.00268 ± 0.00004	0.00138 ± 0.000063	0.000081 ± 0.000014	1.85E-14	99.1	12.28514	386.9 ± 1.4	0.35%
78	2.72661 ± 0.00294	0.18733 ± 0.00049	0.00237 ± 0.00003	0.00006 ± 0.000067	0.000024 ± 0.000015	1.91E-14	99.7	14.51756	449.1 ± 1.5	0.33%
79	1.69434 ± 0.00284	0.13928 ± 0.00045	0.00173 ± 0.00003	-0.00006 ± 0.000074	0.000027 ± 0.000015	1.19E-14	99.5	12.10757	381.9 ± 1.7	0.44%
80	1.80127 ± 0.00287	0.12544 ± 0.00041	0.00162 ± 0.00004	0.00123 ± 0.000052	0.000033 ± 0.000013	1.26E-14	99.5	14.28246	442.7 ± 1.9	0.42%
81	2.08080 ± 0.00417	0.14529 ± 0.00039	0.00185 ± 0.00004	0.00001 ± 0.000061	-0.000050 ± 0.000021	1.46E-14	100.7	14.32161	443.8 ± 2.0	0.45%
82	1.79130 ± 0.00182	0.13921 ± 0.00069	0.00180 ± 0.00002	0.00009 ± 0.000040	0.000038 ± 0.000015	1.25E-14	99.4	12.78797	401.1 ± 2.3	0.57%
83	1.81675 ± 0.00209	0.14342 ± 0.00069	0.00191 ± 0.00004	0.00020 ± 0.000063	0.000038 ± 0.000012	1.27E-14	99.4	12.58967	395.5 ± 2.1	0.54%
84	0.57118 ± 0.00150	0.04537 ± 0.00014	0.00062 ± 0.00004	0.00009 ± 0.000046	-0.000003 ± 0.000015	4.00E-15	100.1	12.58935	395.5 ± 3.4	0.86%
85	3.13416 ± 0.00376	0.24490 ± 0.00077	0.00314 ± 0.00006	0.00051 ± 0.000041	0.000053 ± 0.000016	2.19E-14	99.5	12.73346	399.6 ± 1.5	0.37%
86	0.41657 ± 0.00070	0.04047 ± 0.00014	0.00054 ± 0.00002	-0.00001 ± 0.000065	-0.000032 ± 0.000022	2.92E-15	102.3	10.29199	329.5 ± 5.3	1.61%
87	2.11313 ± 0.00173	0.18620 ± 0.00038	0.00239 ± 0.00006	0.00010 ± 0.000061	0.000031 ± 0.000019	1.48E-14	99.6	11.29994	358.8 ± 1.2	0.35%

88	2.38093 ± 0.00173	0.20246 ± 0.00061	0.00262 ± 0.00005	0.00013 ± 0.000053	0.000080 ± 0.000020	1.67E-14	99.0	11.64375	368.7 ± 1.5	0.40%
89	1.45797 ± 0.00196	0.10008 ± 0.00043	0.00141 ± 0.00005	0.00016 ± 0.000063	0.000028 ± 0.000021	1.02E-14	99.4	14.48571	448.3 ± 2.8	0.62%
90	3.75797 ± 0.00346	0.25953 ± 0.00048	0.00337 ± 0.00006	0.00148 ± 0.000075	0.000075 ± 0.000020	2.63E-14	99.4	14.39540	445.8 ± 1.2	0.26%
91	1.65269 ± 0.00195	0.12667 ± 0.00035	0.00170 ± 0.00004	0.00038 ± 0.000062	0.000027 ± 0.000019	1.16E-14	99.5	12.98357	406.6 ± 1.9	0.46%
92	2.17659 ± 0.00372	0.14867 ± 0.00032	0.00193 ± 0.00004	0.00014 ± 0.000055	-0.000034 ± 0.000021	1.52E-14	100.5	14.64033	452.5 ± 1.8	0.40%
93	1.94899 ± 0.00312	0.13354 ± 0.00055	0.00185 ± 0.00005	0.00012 ± 0.000073	-0.000058 ± 0.000022	1.36E-14	100.9	14.59502	451.3 ± 2.5	0.55%
94	2.02379 ± 0.00221	0.15119 ± 0.00020	0.00194 ± 0.00005	0.00017 ± 0.000066	-0.000008 ± 0.000023	1.42E-14	100.1	13.38597	417.9 ± 1.6	0.38%
95	2.07547 ± 0.00227	0.18867 ± 0.00059	0.00237 ± 0.00004	0.00018 ± 0.000038	0.000039 ± 0.000014	1.45E-14	99.4	10.93947	348.4 ± 1.4	0.39%
96	0.23914 ± 0.00054	0.02372 ± 0.00013	0.00028 ± 0.00002	0.00009 ± 0.000040	-0.000076 ± 0.000022	1.67E-15	109.4	10.08010	323.3 ± 9.0	2.80%
97	2.08985 ± 0.00209	0.17469 ± 0.00071	0.00223 ± 0.00004	0.00020 ± 0.000038	0.000065 ± 0.000023	1.46E-14	99.1	11.85378	374.7 ± 2.0	0.54%
98	1.73852 ± 0.00127	0.11839 ± 0.00057	0.00159 ± 0.00003	0.00020 ± 0.000064	0.000025 ± 0.000022	1.22E-14	99.6	14.62299	452.0 ± 2.8	0.61%
99	1.52742 ± 0.00278	0.15071 ± 0.00060	0.00196 ± 0.00004	0.00007 ± 0.000053	0.000051 ± 0.000023	1.07E-14	99.0	10.03441	322.0 ± 2.0	0.63%
100	1.97725 ± 0.00314	0.15002 ± 0.00071	0.00194 ± 0.00006	0.00036 ± 0.000105	0.000083 ± 0.000022	1.38E-14	98.8	13.01709	407.6 ± 2.5	0.61%
101	1.74775 ± 0.00154	0.12004 ± 0.00045	0.00154 ± 0.00003	0.00004 ± 0.000070	0.000078 ± 0.000023	1.22E-14	98.7	14.36723	445.0 ± 2.5	0.55%
102	1.68329 ± 0.00173	0.14615 ± 0.00040	0.00181 ± 0.00004	0.00005 ± 0.000049	0.000103 ± 0.000022	1.18E-14	98.2	11.30941	359.1 ± 1.8	0.49%
103	1.89073 ± 0.00206	0.13034 ± 0.00036	0.00165 ± 0.00003	0.00021 ± 0.000049	0.000095 ± 0.000022	1.32E-14	98.5	14.29095	442.9 ± 2.0	0.46%
104	0.72592 ± 0.00112	0.06195 ± 0.00016	0.00080 ± 0.00003	0.00007 ± 0.000071	0.000041 ± 0.000023	5.08E-15	98.3	11.52049	365.1 ± 3.6	0.99%
105	2.12506 ± 0.00262	0.19237 ± 0.00058	0.00234 ± 0.00004	0.00016 ± 0.000070	0.000071 ± 0.000021	1.49E-14	99.0	10.93779	348.3 ± 1.5	0.44%
106	0.71214 ± 0.00112	0.07044 ± 0.00044	0.00085 ± 0.00004	0.00006 ± 0.000045	0.000027 ± 0.000021	4.99E-15	98.9	9.99803	320.9 ± 3.6	1.11%
107	1.59101 ± 0.00141	0.13734 ± 0.00050	0.00183 ± 0.00005	0.00073 ± 0.000042	0.000052 ± 0.000016	1.11E-14	99.0	11.47298	363.8 ± 1.7	0.48%
108	1.48763 ± 0.00200	0.12919 ± 0.00042	0.00165 ± 0.00003	-0.00003 ± 0.000044	0.000014 ± 0.000013	1.04E-14	99.7	11.48195	364.0 ± 1.6	0.44%
109	1.29048 ± 0.00126	0.11000 ± 0.00046	0.00146 ± 0.00004	-0.00003 ± 0.000056	0.000022 ± 0.000013	9.04E-15	99.5	11.67311	369.5 ± 1.9	0.52%
110	1.96509 ± 0.00234	0.19432 ± 0.00055	0.00251 ± 0.00006	0.00026 ± 0.000054	0.000030 ± 0.000014	1.38E-14	99.5	10.06681	322.9 ± 1.2	0.37%
111	2.13416 ± 0.00162	0.21183 ± 0.00056	0.00274 ± 0.00004	0.00167 ± 0.000071	0.000045 ± 0.000014	1.49E-14	99.4	10.01302	321.3 ± 1.1	0.34%
112	1.43276 ± 0.00120	0.09903 ± 0.00032	0.00125 ± 0.00004	0.00005 ± 0.000038	0.000029 ± 0.000011	1.00E-14	99.4	14.38086	445.4 ± 1.8	0.41%

au16.2a.mus (CHN) Mitchell Moore *j=0.00106311±0.000008 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
Blank	0.02862 ± 0.00022	0.00023 ± 0.00003	0.00006 ± 0.00002	0.00019 ± 0.00002	0.00012 ± 0.00001					
1	5.03593 ± 0.00371	0.26466 ± 0.00060	0.0033 ± 0.00004	0.00067 ± 0.00013	0.000013 ± 0.000023	2.73E-14	99.9	19.01455	445.1 ± 1.2	0.27%
2	4.19797 ± 0.00256	0.22226 ± 0.00063	0.0030 ± 0.00005	-0.00018 ± 0.00010	0.000080 ± 0.000015	2.28E-14	99.4	18.78097	440.2 ± 1.4	0.31%
3	6.80475 ± 0.00277	0.36097 ± 0.00090	0.0045 ± 0.00005	-0.00039 ± 0.00013	-0.000011 ± 0.000014	3.69E-14	100.0	18.85124	441.7 ± 1.2	0.26%
4	1.46499 ± 0.00189	0.08693 ± 0.00014	0.0011 ± 0.00002	0.00012 ± 0.00025	0.000013 ± 0.000015	7.95E-15	99.7	16.80995	398.8 ± 1.5	0.37%
5	3.18542 ± 0.00123	0.16758 ± 0.00034	0.0022 ± 0.00003	0.00067 ± 0.00028	0.000015 ± 0.000015	1.73E-14	99.9	18.98275	444.4 ± 1.1	0.25%
6	1.18013 ± 0.00136	0.08067 ± 0.00044	0.0010 ± 0.00003	-0.00041 ± 0.00024	0.000043 ± 0.000015	6.41E-15	98.9	14.47170	348.3 ± 2.4	0.68%
7	2.17301 ± 0.00278	0.13791 ± 0.00042	0.0017 ± 0.00003	0.00011 ± 0.00023	0.000037 ± 0.000017	1.18E-14	99.5	15.67685	374.5 ± 1.5	0.41%
8	2.37022 ± 0.00191	0.12499 ± 0.00041	0.0015 ± 0.00003	0.00009 ± 0.00025	-0.000007 ± 0.000018	1.29E-14	100.1	18.96386	444.0 ± 1.8	0.40%
9	5.51781 ± 0.00362	0.29523 ± 0.00067	0.0036 ± 0.00003	-0.00003 ± 0.00016	0.000087 ± 0.000018	2.99E-14	99.5	18.60290	436.5 ± 1.1	0.26%

10	4.11548 ± 0.00226	0.30897 ± 0.00063	0.0039 ± 0.00006	0.00021 ± 0.00024	0.000153 ± 0.000017	2.23E-14	98.9	13.17351	319.6 ± 0.8	0.25%
11	2.34277 ± 0.00159	0.12457 ± 0.00047	0.0016 ± 0.00003	0.00041 ± 0.00018	0.000080 ± 0.000015	1.27E-14	99.0	18.61737	436.8 ± 1.9	0.43%
12	1.21141 ± 0.00143	0.06540 ± 0.00027	0.0008 ± 0.00004	-0.00017 ± 0.00026	0.000106 ± 0.000026	6.58E-15	97.4	18.04679	424.9 ± 3.3	0.78%
13	3.31154 ± 0.00272	0.20307 ± 0.00039	0.0024 ± 0.00003	0.00001 ± 0.00017	0.000087 ± 0.000025	1.80E-14	99.2	16.18132	385.3 ± 1.2	0.31%
14	2.65227 ± 0.00285	0.14044 ± 0.00052	0.0017 ± 0.00004	0.00011 ± 0.00022	0.000070 ± 0.000026	1.44E-14	99.2	18.73840	439.3 ± 2.1	0.48%
15	2.56273 ± 0.00209	0.13698 ± 0.00044	0.0016 ± 0.00003	0.00008 ± 0.00025	0.000047 ± 0.000025	1.39E-14	99.5	18.60813	436.6 ± 1.9	0.44%
16	2.08790 ± 0.00123	0.15958 ± 0.00064	0.0020 ± 0.00004	0.00072 ± 0.00021	0.000016 ± 0.000014	1.13E-14	99.8	13.05360	317.0 ± 1.4	0.45%
17	4.82123 ± 0.00328	0.25720 ± 0.00118	0.0032 ± 0.00004	0.00138 ± 0.00024	0.000038 ± 0.000014	2.62E-14	99.8	18.70228	438.6 ± 2.1	0.47%
18	1.43633 ± 0.00200	0.09729 ± 0.00049	0.0012 ± 0.00004	0.00058 ± 0.00026	0.000036 ± 0.000016	7.80E-15	99.3	14.65504	352.3 ± 2.2	0.62%
19	3.28613 ± 0.00185	0.17458 ± 0.00044	0.0023 ± 0.00006	0.00102 ± 0.00026	0.000047 ± 0.000015	1.78E-14	99.6	18.74334	439.4 ± 1.3	0.29%
20	1.97307 ± 0.00233	0.13260 ± 0.00027	0.0017 ± 0.00005	0.00102 ± 0.00022	0.000029 ± 0.000015	1.07E-14	99.6	14.81650	355.8 ± 1.1	0.32%
21	5.69981 ± 0.00257	0.30048 ± 0.00079	0.0037 ± 0.00004	0.00019 ± 0.00025	0.000106 ± 0.000019	3.09E-14	99.4	18.86452	442.0 ± 1.3	0.29%
22	2.81362 ± 0.00267	0.18275 ± 0.00054	0.0023 ± 0.00003	-0.00050 ± 0.00018	-0.000027 ± 0.000028	1.53E-14	100.3	15.39585	368.4 ± 1.6	0.43%
23	3.94416 ± 0.00332	0.21012 ± 0.00068	0.0027 ± 0.00004	0.00054 ± 0.00019	0.000050 ± 0.000017	2.14E-14	99.6	18.70069	438.5 ± 1.6	0.36%
24	2.46387 ± 0.00190	0.12944 ± 0.00021	0.0016 ± 0.00004	-0.00005 ± 0.00013	-0.000006 ± 0.000016	1.34E-14	100.1	19.03536	445.5 ± 1.2	0.26%
25	3.47634 ± 0.00223	0.18287 ± 0.00035	0.0023 ± 0.00003	0.00031 ± 0.00016	0.000036 ± 0.000018	1.89E-14	99.7	18.95181	443.8 ± 1.1	0.26%
26	2.30182 ± 0.00213	0.12691 ± 0.00049	0.0016 ± 0.00005	-0.00004 ± 0.00016	0.000138 ± 0.000030	1.25E-14	98.2	17.81696	420.1 ± 2.4	0.56%
27	6.04894 ± 0.00366	0.32180 ± 0.00076	0.0039 ± 0.00006	0.00013 ± 0.00022	0.000109 ± 0.000030	3.28E-14	99.5	18.69695	438.5 ± 1.3	0.29%
28	1.63244 ± 0.00286	0.08652 ± 0.00026	0.0012 ± 0.00004	0.00038 ± 0.00020	0.000036 ± 0.000039	8.86E-15	99.4	18.74590	439.5 ± 3.5	0.79%
29	2.99390 ± 0.00250	0.15948 ± 0.00024	0.0020 ± 0.00004	0.00005 ± 0.00027	0.000079 ± 0.000030	1.62E-14	99.2	18.62673	437.0 ± 1.5	0.34%
30	4.55517 ± 0.00273	0.24125 ± 0.00097	0.0029 ± 0.00004	0.00010 ± 0.00025	0.000109 ± 0.000030	2.47E-14	99.3	18.74769	439.5 ± 2.0	0.45%
31	4.64952 ± 0.00380	0.24570 ± 0.00088	0.0030 ± 0.00004	0.00006 ± 0.00022	0.000117 ± 0.000016	2.52E-14	99.3	18.78233	440.2 ± 1.7	0.39%
32	7.36682 ± 0.00411	0.38979 ± 0.00062	0.0048 ± 0.00005	0.00033 ± 0.00031	0.000125 ± 0.000017	4.00E-14	99.5	18.80523	440.7 ± 0.8	0.18%
33	2.21414 ± 0.00210	0.11588 ± 0.00043	0.0015 ± 0.00002	-0.00040 ± 0.00031	-0.000034 ± 0.000030	1.20E-14	100.5	19.10733	447.0 ± 2.5	0.55%
34	4.60904 ± 0.00372	0.24364 ± 0.00068	0.0029 ± 0.00004	-0.00020 ± 0.00021	0.000171 ± 0.000024	2.50E-14	98.9	18.71028	438.7 ± 1.5	0.33%
35	2.06325 ± 0.00246	0.12458 ± 0.00035	0.0016 ± 0.00004	-0.00002 ± 0.00020	0.000040 ± 0.000018	1.12E-14	99.4	16.46718	391.4 ± 1.6	0.40%
36	1.28384 ± 0.00101	0.06765 ± 0.00030	0.0009 ± 0.00004	-0.00011 ± 0.00027	-0.000065 ± 0.000034	6.97E-15	101.5	18.97824	444.3 ± 4.0	0.91%
37	2.71271 ± 0.00202	0.14314 ± 0.00043	0.0018 ± 0.00005	0.00074 ± 0.00039	0.000028 ± 0.000026	1.47E-14	99.7	18.89436	442.6 ± 1.8	0.42%
38	1.51911 ± 0.00179	0.08032 ± 0.00032	0.0010 ± 0.00004	0.00009 ± 0.00024	0.000004 ± 0.000026	8.25E-15	99.9	18.89733	442.6 ± 2.9	0.66%
39	1.00579 ± 0.00139	0.06761 ± 0.00041	0.0009 ± 0.00003	-0.00008 ± 0.00022	0.000001 ± 0.000026	5.46E-15	100.0	14.87490	357.1 ± 3.6	0.99%
40	1.00597 ± 0.00109	0.05329 ± 0.00021	0.0007 ± 0.00003	0.00039 ± 0.00028	-0.000027 ± 0.000026	5.46E-15	100.8	18.87667	442.2 ± 3.9	0.87%
41	1.51537 ± 0.00164	0.10065 ± 0.00041	0.0012 ± 0.00004	0.00012 ± 0.00023	0.000059 ± 0.000016	8.22E-15	98.8	14.88133	357.2 ± 1.9	0.53%
42	1.74968 ± 0.00151	0.11705 ± 0.00039	0.0015 ± 0.00005	0.00044 ± 0.00024	0.000042 ± 0.000015	9.50E-15	99.3	14.84258	356.4 ± 1.5	0.42%
43	3.98990 ± 0.00308	0.21217 ± 0.00064	0.0026 ± 0.00003	0.00019 ± 0.00025	0.000037 ± 0.000016	2.17E-14	99.7	18.75317	439.6 ± 1.5	0.33%
44	1.59919 ± 0.00194	0.09731 ± 0.00038	0.0012 ± 0.00003	0.00022 ± 0.00019	0.000071 ± 0.000014	8.68E-15	98.7	16.21876	386.1 ± 1.9	0.49%
45	4.52037 ± 0.00230	0.24088 ± 0.00076	0.0029 ± 0.00006	0.00025 ± 0.00028	0.000103 ± 0.000013	2.45E-14	99.3	18.64036	437.3 ± 1.5	0.33%
46	3.36939 ± 0.00442	0.17916 ± 0.00050	0.0022 ± 0.00004	0.00015 ± 0.00018	0.000006 ± 0.000012	1.83E-14	99.9	18.79639	440.5 ± 1.4	0.33%
47	3.02614 ± 0.00324	0.15811 ± 0.00029	0.0020 ± 0.00003	0.00017 ± 0.00028	0.000055 ± 0.000014	1.64E-14	99.5	19.03586	445.5 ± 1.1	0.25%
48	2.27885 ± 0.00150	0.12069 ± 0.00036	0.0015 ± 0.00004	-0.00006 ± 0.00015	-0.000034 ± 0.000024	1.24E-14	100.4	18.88152	442.3 ± 2.0	0.44%

49	1.23862 ± 0.00253	0.08219 ± 0.00010	0.0010 ± 0.00004	-0.00010 ± 0.00025	0.000070 ± 0.000015	6.72E-15	98.3	14.81722	355.8 ± 1.6	0.45%
50	3.47816 ± 0.00305	0.18477 ± 0.00047	0.0024 ± 0.00006	-0.00005 ± 0.00013	0.000042 ± 0.000015	1.89E-14	99.6	18.75704	439.7 ± 1.3	0.30%
51	1.36669 ± 0.00225	0.07348 ± 0.00035	0.0008 ± 0.00004	-0.00035 ± 0.00029	0.000061 ± 0.000014	7.42E-15	98.7	18.35524	431.3 ± 2.5	0.59%
52	1.45534 ± 0.00146	0.11202 ± 0.00039	0.0013 ± 0.00004	-0.00033 ± 0.00021	-0.000039 ± 0.000019	7.90E-15	100.8	12.99149	315.6 ± 1.7	0.54%
53	1.38271 ± 0.00132	0.07340 ± 0.00035	0.0009 ± 0.00004	-0.00011 ± 0.00020	0.000034 ± 0.000012	7.50E-15	99.3	18.70029	438.5 ± 2.4	0.55%
54	2.31780 ± 0.00245	0.12286 ± 0.00048	0.0015 ± 0.00005	-0.00047 ± 0.00021	0.000058 ± 0.000015	1.26E-14	99.3	18.72533	439.1 ± 2.0	0.45%
55	2.83597 ± 0.00131	0.15000 ± 0.00043	0.0018 ± 0.00004	-0.00044 ± 0.00016	0.000035 ± 0.000012	1.54E-14	99.6	18.83715	441.4 ± 1.4	0.32%
56	2.22696 ± 0.00172	0.11837 ± 0.00044	0.0015 ± 0.00004	-0.00009 ± 0.00016	-0.000009 ± 0.000034	1.21E-14	100.1	18.81318	440.9 ± 2.6	0.59%
57	0.92351 ± 0.00063	0.04935 ± 0.00026	0.0006 ± 0.00003	-0.00047 ± 0.00034	0.000046 ± 0.000021	5.01E-15	98.5	18.43707	433.1 ± 3.8	0.88%
58	2.05240 ± 0.00127	0.10938 ± 0.00032	0.0014 ± 0.00003	-0.00039 ± 0.00015	0.000055 ± 0.000020	1.11E-14	99.2	18.61664	436.8 ± 1.9	0.42%
59	2.35501 ± 0.00258	0.12662 ± 0.00052	0.0016 ± 0.00003	-0.00116 ± 0.00037	0.000005 ± 0.000019	1.28E-14	99.9	18.58774	436.2 ± 2.1	0.49%
60	3.42128 ± 0.00216	0.18475 ± 0.00068	0.0023 ± 0.00004	0.00060 ± 0.00017	0.000032 ± 0.000018	1.86E-14	99.7	18.46764	433.7 ± 1.8	0.41%
61	1.48451 ± 0.00172	0.08351 ± 0.00031	0.0011 ± 0.00004	-0.00005 ± 0.00020	0.000018 ± 0.000014	8.06E-15	99.6	17.71294	417.9 ± 2.0	0.48%
62	0.61244 ± 0.00076	0.03241 ± 0.00029	0.0005 ± 0.00002	0.00039 ± 0.00026	0.000004 ± 0.000016	3.32E-15	99.8	18.85676	441.8 ± 5.4	1.21%
63	0.68952 ± 0.00086	0.03655 ± 0.00016	0.0006 ± 0.00003	0.00010 ± 0.00015	0.000015 ± 0.000015	3.74E-15	99.4	18.74409	439.5 ± 3.5	0.80%
64	0.46690 ± 0.00108	0.02433 ± 0.00014	0.0003 ± 0.00003	0.00073 ± 0.00020	0.000015 ± 0.000016	2.53E-15	99.0	19.00820	444.9 ± 5.3	1.18%
65	1.33888 ± 0.00199	0.07098 ± 0.00026	0.0009 ± 0.00003	0.00041 ± 0.00023	0.000024 ± 0.000016	7.27E-15	99.5	18.76241	439.8 ± 2.4	0.54%
66	0.57208 ± 0.00129	0.02929 ± 0.00019	0.0004 ± 0.00003	0.00003 ± 0.00022	0.000057 ± 0.000016	3.10E-15	97.1	18.95545	443.8 ± 4.9	1.10%
67	1.14022 ± 0.00101	0.05995 ± 0.00016	0.0007 ± 0.00004	0.00097 ± 0.00030	0.000027 ± 0.000014	6.19E-15	99.3	18.88686	442.4 ± 2.1	0.47%
68	2.18697 ± 0.00231	0.11546 ± 0.00046	0.0015 ± 0.00004	0.00020 ± 0.00021	0.000025 ± 0.000014	1.19E-14	99.7	18.87871	442.3 ± 2.0	0.45%
69	1.46012 ± 0.00168	0.09779 ± 0.00036	0.0012 ± 0.00003	0.00020 ± 0.00021	0.000023 ± 0.000015	7.92E-15	99.5	14.86217	356.8 ± 1.8	0.49%
70	0.27328 ± 0.00056	0.01452 ± 0.00006	0.0002 ± 0.00002	0.00000 ± 0.00027	-0.000014 ± 0.000015	1.48E-15	101.5	18.82502	441.1 ± 7.5	1.70%
71	0.39200 ± 0.00049	0.02943 ± 0.00010	0.0004 ± 0.00003	0.00002 ± 0.00019	-0.000011 ± 0.000014	2.13E-15	100.9	13.32170	322.9 ± 3.6	1.13%
72	1.07432 ± 0.00202	0.05781 ± 0.00033	0.0008 ± 0.00003	-0.00003 ± 0.00014	-0.000036 ± 0.000025	5.83E-15	101.0	18.58385	436.1 ± 3.9	0.90%
73	1.28591 ± 0.00123	0.07586 ± 0.00011	0.0010 ± 0.00003	0.00010 ± 0.00024	-0.000043 ± 0.000026	6.98E-15	101.0	16.95075	401.7 ± 2.5	0.62%
74	2.98311 ± 0.00270	0.20038 ± 0.00042	0.0025 ± 0.00004	0.00039 ± 0.00018	0.000033 ± 0.000013	1.62E-14	99.7	14.83824	356.3 ± 0.9	0.26%
75	0.77875 ± 0.00177	0.04999 ± 0.00023	0.0006 ± 0.00004	0.00024 ± 0.00019	0.000021 ± 0.000013	4.23E-15	99.2	15.45358	369.7 ± 2.6	0.71%
76	2.32236 ± 0.00095	0.12443 ± 0.00046	0.0016 ± 0.00004	0.00027 ± 0.00014	0.000010 ± 0.000016	1.26E-14	99.9	18.64193	437.3 ± 1.9	0.43%
77	2.85700 ± 0.00295	0.15031 ± 0.00049	0.0019 ± 0.00005	0.00055 ± 0.00028	0.000020 ± 0.000016	1.55E-14	99.8	18.96754	444.1 ± 1.7	0.38%
78	2.41662 ± 0.00140	0.12702 ± 0.00057	0.0016 ± 0.00004	0.00047 ± 0.00030	0.000034 ± 0.000015	1.31E-14	99.6	18.94835	443.7 ± 2.2	0.49%
79	2.33552 ± 0.00155	0.12313 ± 0.00031	0.0016 ± 0.00006	0.00002 ± 0.00030	0.000035 ± 0.000015	1.27E-14	99.6	18.88390	442.4 ± 1.4	0.32%
80	1.26696 ± 0.00212	0.08762 ± 0.00021	0.0010 ± 0.00003	0.00052 ± 0.00018	0.000028 ± 0.000015	6.88E-15	99.4	14.36624	346.0 ± 1.6	0.46%
81	2.31160 ± 0.00289	0.15200 ± 0.00066	0.0019 ± 0.00003	0.00015 ± 0.00015	0.000071 ± 0.000017	1.25E-14	99.1	15.06997	361.3 ± 1.8	0.51%
82	3.70584 ± 0.00427	0.19609 ± 0.00045	0.0024 ± 0.00004	-0.00002 ± 0.00026	0.000013 ± 0.000016	2.01E-14	99.9	18.87906	442.3 ± 1.3	0.29%
83	1.17566 ± 0.00138	0.06100 ± 0.00013	0.0006 ± 0.00006	-0.00005 ± 0.00026	0.000042 ± 0.000015	6.38E-15	98.9	19.06918	446.2 ± 2.0	0.46%
84	1.76692 ± 0.00192	0.13368 ± 0.00055	0.0017 ± 0.00003	-0.00053 ± 0.00017	0.000019 ± 0.000012	9.59E-15	99.7	13.17567	319.7 ± 1.5	0.47%
85	1.79665 ± 0.00182	0.13711 ± 0.00041	0.0016 ± 0.00004	-0.00038 ± 0.00014	0.000030 ± 0.000016	9.75E-15	99.5	13.03957	316.7 ± 1.3	0.41%
86	3.03505 ± 0.00253	0.16081 ± 0.00068	0.0021 ± 0.00005	-0.00030 ± 0.00033	0.000018 ± 0.000013	1.65E-14	99.8	18.84169	441.5 ± 2.0	0.45%
87	1.34150 ± 0.00135	0.08988 ± 0.00031	0.0011 ± 0.00003	-0.00029 ± 0.00029	-0.000003 ± 0.000014	7.28E-15	100.1	14.92442	358.2 ± 1.7	0.47%

88	1.63929 ± 0.00157	0.09686 ± 0.00018	0.0012 ± 0.00004	-0.00005 ± 0.00025	0.000009 ± 0.000015	8.90E-15	99.8	16.89834	400.6 ± 1.4	0.34%
89	1.07401 ± 0.00204	0.05697 ± 0.00015	0.0007 ± 0.00003	-0.00006 ± 0.00018	0.000009 ± 0.000016	5.83E-15	99.7	18.80243	440.7 ± 2.4	0.55%
90	1.39688 ± 0.00067	0.07494 ± 0.00047	0.0010 ± 0.00002	-0.00026 ± 0.00034	0.000003 ± 0.000017	7.58E-15	99.9	18.62620	437.0 ± 3.2	0.73%
91	4.25401 ± 0.00284	0.22650 ± 0.00068	0.0028 ± 0.00004	0.00018 ± 0.00025	0.000054 ± 0.000015	2.31E-14	99.6	18.71119	438.8 ± 1.4	0.33%
92	2.96200 ± 0.00245	0.15505 ± 0.00037	0.0019 ± 0.00003	0.00038 ± 0.00031	0.000068 ± 0.000014	1.61E-14	99.3	18.97352	444.2 ± 1.3	0.29%
93	2.50425 ± 0.00289	0.13355 ± 0.00027	0.0016 ± 0.00004	-0.00011 ± 0.00032	0.000022 ± 0.000014	1.36E-14	99.7	18.70207	438.6 ± 1.3	0.29%
94	1.76482 ± 0.00147	0.11738 ± 0.00028	0.0014 ± 0.00005	-0.00084 ± 0.00025	0.000040 ± 0.000017	9.58E-15	99.3	14.93413	358.4 ± 1.4	0.38%
95	1.81442 ± 0.00158	0.13761 ± 0.00057	0.0017 ± 0.00004	0.00015 ± 0.00014	0.000001 ± 0.000017	9.85E-15	100.0	13.18369	319.9 ± 1.6	0.50%
96	1.32967 ± 0.00227	0.07172 ± 0.00030	0.0009 ± 0.00003	0.00011 ± 0.00021	0.000040 ± 0.000017	7.22E-15	99.1	18.37245	431.7 ± 2.6	0.59%
97	2.10521 ± 0.00148	0.11147 ± 0.00019	0.0014 ± 0.00003	0.00018 ± 0.00028	0.000047 ± 0.000017	1.14E-14	99.3	18.76258	439.8 ± 1.3	0.30%
98	4.20398 ± 0.00245	0.22070 ± 0.00038	0.0027 ± 0.00005	0.00017 ± 0.00020	0.000097 ± 0.000015	2.28E-14	99.3	18.91924	443.1 ± 0.9	0.21%
99	0.53901 ± 0.00094	0.03481 ± 0.00011	0.0005 ± 0.00004	0.00027 ± 0.00015	-0.000054 ± 0.000025	2.93E-15	103.0	15.48387	370.3 ± 5.2	1.39%
100	0.83478 ± 0.00135	0.04355 ± 0.00011	0.0005 ± 0.00003	-0.00026 ± 0.00030	0.000009 ± 0.000017	4.53E-15	99.7	19.10721	447.0 ± 3.1	0.69%
101	1.48767 ± 0.00206	0.07813 ± 0.00029	0.0010 ± 0.00004	-0.00053 ± 0.00016	-0.000011 ± 0.000016	8.07E-15	100.2	19.03958	445.6 ± 2.2	0.50%
102	1.68932 ± 0.00209	0.08926 ± 0.00026	0.0011 ± 0.00004	-0.00012 ± 0.00017	0.000006 ± 0.000014	9.17E-15	99.9	18.90363	442.8 ± 1.8	0.40%
103	1.55465 ± 0.00285	0.08339 ± 0.00045	0.0011 ± 0.00003	0.00012 ± 0.00015	0.000040 ± 0.000016	8.44E-15	99.2	18.50069	434.4 ± 2.8	0.65%
104	0.74412 ± 0.00086	0.05021 ± 0.00019	0.0006 ± 0.00003	-0.00028 ± 0.00018	0.000016 ± 0.000016	4.04E-15	99.4	14.72347	353.8 ± 2.7	0.76%

au16.3d.mus (D2-S3) Mitchell Moore *j=0.00081767±0.000005 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
Blank	0.01860 ± 0.00023	0.00026 ± 0.00003	0.00007 ± 0.00001	0.00028 ± 0.00002	0.00004 ± 0.00002					
1	2.30839 ± 0.00210	0.11982 ± 0.00059	0.0014 ± 0.00003	-0.00551 ± 0.00109	0.000035 ± 0.000010	9.83E-15	99.6	19.17600	451.0 ± 2.3	0.52%
2	1.80111 ± 0.00225	0.09270 ± 0.00031	0.0011 ± 0.00002	-0.00291 ± 0.00132	0.000074 ± 0.000012	7.67E-15	98.8	19.18933	451.3 ± 1.9	0.41%
3	2.13351 ± 0.00184	0.11084 ± 0.00047	0.0013 ± 0.00003	-0.00562 ± 0.00096	0.000025 ± 0.000010	9.08E-15	99.7	19.17853	451.0 ± 2.1	0.46%
4	4.20612 ± 0.00321	0.22376 ± 0.00072	0.0028 ± 0.00003	-0.00227 ± 0.00155	0.000142 ± 0.000013	1.79E-14	99.0	18.60963	439.2 ± 1.5	0.35%
5	1.97635 ± 0.00155	0.10125 ± 0.00023	0.0012 ± 0.00002	-0.00233 ± 0.00193	0.000050 ± 0.000013	8.41E-15	99.3	19.37174	455.0 ± 1.4	0.31%
6	0.98369 ± 0.00110	0.06056 ± 0.00015	0.0007 ± 0.00003	-0.00563 ± 0.00097	0.000019 ± 0.000011	4.19E-15	99.4	16.14073	386.7 ± 1.7	0.45%
7	4.68621 ± 0.00442	0.23780 ± 0.00052	0.0028 ± 0.00004	-0.00055 ± 0.00161	0.000072 ± 0.000011	1.99E-14	99.5	19.61669	460.1 ± 1.1	0.25%
8	4.90290 ± 0.00342	0.31324 ± 0.00051	0.0038 ± 0.00004	-0.00151 ± 0.00157	0.000139 ± 0.000010	2.09E-14	99.2	15.52055	373.3 ± 0.7	0.19%
9	4.12508 ± 0.00138	0.21543 ± 0.00043	0.0026 ± 0.00004	-0.00058 ± 0.00111	0.000031 ± 0.000009	1.76E-14	99.8	19.10559	449.5 ± 1.0	0.21%
10	4.33099 ± 0.00256	0.24899 ± 0.00042	0.0031 ± 0.00003	0.00002 ± 0.00173	0.000064 ± 0.000011	1.84E-14	99.6	17.31798	411.9 ± 0.8	0.19%
11	3.45146 ± 0.00349	0.17767 ± 0.00069	0.0022 ± 0.00003	-0.00055 ± 0.00108	0.000056 ± 0.000010	1.47E-14	99.5	19.33310	454.2 ± 1.9	0.41%
12	4.72078 ± 0.00361	0.24212 ± 0.00057	0.0029 ± 0.00003	-0.00105 ± 0.00101	0.000119 ± 0.000010	2.01E-14	99.3	19.35189	454.6 ± 1.2	0.26%
13	1.39340 ± 0.00129	0.07303 ± 0.00030	0.0009 ± 0.00003	-0.00156 ± 0.00114	0.000028 ± 0.000010	5.93E-15	99.4	18.96323	446.5 ± 2.2	0.48%
14	1.60750 ± 0.00177	0.08377 ± 0.00040	0.0010 ± 0.00002	0.00072 ± 0.00134	0.000016 ± 0.000010	6.84E-15	99.7	19.13579	450.1 ± 2.4	0.52%
15	0.71500 ± 0.00105	0.04588 ± 0.00020	0.0006 ± 0.00002	-0.00156 ± 0.00151	0.000017 ± 0.000010	3.04E-15	99.3	15.47555	372.3 ± 2.3	0.63%
16	1.84595 ± 0.00222	0.10461 ± 0.00027	0.0011 ± 0.00005	-0.00086 ± 0.00137	0.000036 ± 0.000010	7.86E-15	99.4	17.54376	416.7 ± 1.4	0.33%
17	2.80182 ± 0.00375	0.14444 ± 0.00043	0.0018 ± 0.00005	-0.00206 ± 0.00139	0.000063 ± 0.000010	1.19E-14	99.3	19.26715	452.9 ± 1.6	0.35%

18	2.69529 ± 0.00306	0.13713 ± 0.00029	0.0017 ± 0.00002	0.00027 ± 0.00117	0.000076 ± 0.000012	1.15E-14	99.2	19.49167	457.5 ± 1.3	0.28%
19	3.35756 ± 0.00478	0.20849 ± 0.00062	0.0025 ± 0.00004	0.00181 ± 0.00086	0.000026 ± 0.000011	1.43E-14	99.8	16.06853	385.1 ± 1.3	0.34%
20	2.71154 ± 0.00288	0.16386 ± 0.00050	0.0020 ± 0.00004	0.00098 ± 0.00105	0.000034 ± 0.000012	1.15E-14	99.6	16.48683	394.1 ± 1.4	0.35%
21	3.87650 ± 0.00353	0.19903 ± 0.00048	0.0025 ± 0.00003	0.00000 ± 0.00113	0.000058 ± 0.000013	1.65E-14	99.6	19.39115	455.5 ± 1.3	0.28%
22	3.51862 ± 0.00183	0.17768 ± 0.00070	0.0022 ± 0.00003	0.00107 ± 0.00118	0.000021 ± 0.000014	1.50E-14	99.8	19.76797	463.3 ± 1.9	0.41%
23	1.95835 ± 0.00244	0.12798 ± 0.00064	0.0016 ± 0.00004	0.00453 ± 0.00173	0.000091 ± 0.000010	8.34E-15	98.6	15.09515	364.0 ± 2.0	0.55%
24	1.83388 ± 0.00156	0.11493 ± 0.00030	0.0014 ± 0.00003	0.00293 ± 0.00126	0.000042 ± 0.000009	7.81E-15	99.3	15.84989	380.4 ± 1.2	0.32%
25	1.62474 ± 0.00219	0.08427 ± 0.00043	0.0010 ± 0.00003	0.00139 ± 0.00083	0.000028 ± 0.000009	6.92E-15	99.5	19.18137	451.1 ± 2.5	0.56%
26	1.55439 ± 0.00161	0.09534 ± 0.00037	0.0012 ± 0.00002	0.00376 ± 0.00082	0.000010 ± 0.000010	6.62E-15	99.8	16.27723	389.6 ± 1.7	0.44%
27	2.17154 ± 0.00300	0.11331 ± 0.00049	0.0014 ± 0.00003	0.00133 ± 0.00109	0.000012 ± 0.000009	9.24E-15	99.8	19.13386	450.1 ± 2.1	0.47%
28	2.68688 ± 0.00130	0.13701 ± 0.00033	0.0018 ± 0.00006	-0.00146 ± 0.00128	0.000077 ± 0.000009	1.14E-14	99.2	19.44481	456.6 ± 1.2	0.27%
29	2.34695 ± 0.00197	0.12692 ± 0.00045	0.0015 ± 0.00004	-0.00409 ± 0.00117	0.000074 ± 0.000009	9.99E-15	99.1	18.31591	433.0 ± 1.7	0.38%
30	2.21475 ± 0.00168	0.11612 ± 0.00055	0.0014 ± 0.00004	-0.00500 ± 0.00055	0.000033 ± 0.000011	9.43E-15	99.6	18.98591	447.0 ± 2.3	0.50%
31	1.36825 ± 0.00145	0.07073 ± 0.00039	0.0008 ± 0.00002	-0.00188 ± 0.00190	0.000023 ± 0.000009	5.82E-15	99.5	19.24552	452.4 ± 2.7	0.60%
32	1.46980 ± 0.00164	0.10414 ± 0.00034	0.0013 ± 0.00003	-0.00060 ± 0.00090	0.000022 ± 0.000009	6.26E-15	99.6	14.04988	341.0 ± 1.3	0.39%
33	1.52853 ± 0.00161	0.07973 ± 0.00034	0.0010 ± 0.00002	0.00519 ± 0.00088	0.000050 ± 0.000012	6.51E-15	99.1	18.99135	447.1 ± 2.2	0.50%
34	2.40771 ± 0.00264	0.15209 ± 0.00064	0.0018 ± 0.00004	0.00094 ± 0.00124	0.000036 ± 0.000010	1.02E-14	99.6	15.76113	378.5 ± 1.7	0.45%
35	3.81399 ± 0.00381	0.19248 ± 0.00080	0.0024 ± 0.00002	0.00246 ± 0.00102	0.000168 ± 0.000011	1.62E-14	98.7	19.55729	458.9 ± 2.0	0.44%
36	3.63355 ± 0.00296	0.18731 ± 0.00034	0.0022 ± 0.00002	0.00282 ± 0.00151	0.000031 ± 0.000010	1.55E-14	99.8	19.35101	454.6 ± 1.0	0.22%
37	0.52214 ± 0.00099	0.03269 ± 0.00015	0.0004 ± 0.00002	0.00347 ± 0.00106	0.000004 ± 0.000011	2.22E-15	99.8	15.94763	382.5 ± 3.0	0.78%
38	1.35127 ± 0.00202	0.08919 ± 0.00043	0.0011 ± 0.00003	-0.00023 ± 0.00101	0.000016 ± 0.000010	5.75E-15	99.6	15.09519	364.0 ± 2.0	0.56%
39	3.06458 ± 0.00168	0.15753 ± 0.00059	0.0020 ± 0.00006	0.00196 ± 0.00105	0.000034 ± 0.000011	1.30E-14	99.7	19.39141	455.5 ± 1.8	0.40%
40	2.05282 ± 0.00150	0.10542 ± 0.00037	0.0013 ± 0.00003	-0.00028 ± 0.00169	0.000026 ± 0.000011	8.74E-15	99.6	19.39751	455.6 ± 1.8	0.40%
41	1.32450 ± 0.00156	0.07407 ± 0.00026	0.0010 ± 0.00003	0.00289 ± 0.00120	0.000038 ± 0.000010	5.64E-15	99.2	17.73240	420.7 ± 1.8	0.43%
42	4.15531 ± 0.00441	0.25155 ± 0.00064	0.0033 ± 0.00007	0.00307 ± 0.00074	0.000090 ± 0.000011	1.77E-14	99.4	16.41340	392.6 ± 1.1	0.29%
43	3.14140 ± 0.00195	0.18904 ± 0.00072	0.0023 ± 0.00003	-0.00058 ± 0.00135	0.000070 ± 0.000011	1.34E-14	99.3	16.50765	394.6 ± 1.6	0.40%
44	3.15555 ± 0.00233	0.16106 ± 0.00047	0.0020 ± 0.00004	0.00205 ± 0.00116	0.000066 ± 0.000011	1.34E-14	99.4	19.47260	457.1 ± 1.5	0.32%
45	2.28001 ± 0.00213	0.11681 ± 0.00050	0.0014 ± 0.00003	0.00245 ± 0.00121	0.000003 ± 0.000012	9.71E-15	100.0	19.51519	458.0 ± 2.1	0.46%
46	1.96628 ± 0.00419	0.11633 ± 0.00030	0.0014 ± 0.00004	-0.00093 ± 0.00150	-0.000010 ± 0.000011	8.37E-15	100.1	16.90183	403.0 ± 1.5	0.37%
47	3.91068 ± 0.00139	0.20026 ± 0.00050	0.0025 ± 0.00004	0.00264 ± 0.00108	0.000084 ± 0.000012	1.66E-14	99.4	19.40591	455.8 ± 1.2	0.27%
48	1.90934 ± 0.00271	0.09942 ± 0.00030	0.0012 ± 0.00003	0.00178 ± 0.00103	0.000025 ± 0.000010	8.13E-15	99.6	19.13086	450.0 ± 1.7	0.37%
49	1.27737 ± 0.00299	0.06534 ± 0.00024	0.0008 ± 0.00003	-0.00026 ± 0.00158	0.000018 ± 0.000009	5.44E-15	99.6	19.47013	457.1 ± 2.2	0.49%
50	2.75038 ± 0.00207	0.14014 ± 0.00050	0.0017 ± 0.00003	0.00007 ± 0.00129	0.000059 ± 0.000011	1.17E-14	99.4	19.50216	457.8 ± 1.8	0.38%
51	5.44891 ± 0.00353	0.30467 ± 0.00101	0.0037 ± 0.00004	0.00173 ± 0.00122	0.000148 ± 0.000011	2.32E-14	99.2	17.74186	420.9 ± 1.5	0.35%
52	2.12698 ± 0.00203	0.12735 ± 0.00099	0.0015 ± 0.00002	0.00963 ± 0.00146	0.000016 ± 0.000009	9.05E-15	99.8	16.67193	398.1 ± 3.1	0.79%
53	2.28663 ± 0.00374	0.11852 ± 0.00039	0.0014 ± 0.00004	0.00351 ± 0.00183	0.000056 ± 0.000010	9.73E-15	99.3	19.15691	450.6 ± 1.8	0.39%
54	1.08369 ± 0.00156	0.07801 ± 0.00044	0.0010 ± 0.00003	0.00113 ± 0.00198	0.000032 ± 0.000009	4.61E-15	99.1	13.77263	334.9 ± 2.1	0.64%
55	1.44207 ± 0.00176	0.07308 ± 0.00026	0.0009 ± 0.00003	0.00645 ± 0.00112	0.000017 ± 0.000010	6.14E-15	99.7	19.67108	461.3 ± 2.0	0.44%
56	1.03069 ± 0.00169	0.05234 ± 0.00018	0.0006 ± 0.00002	0.00366 ± 0.00128	0.000054 ± 0.000011	4.39E-15	98.5	19.39066	455.4 ± 2.3	0.49%

57	2.30253 ± 0.00128	0.11827 ± 0.00044	0.0014 ± 0.00003	0.00278 ± 0.00115	0.000061 ± 0.000010	9.80E-15	99.2	19.31820	453.9 ± 1.8	0.40%
58	1.87226 ± 0.00237	0.09577 ± 0.00031	0.0011 ± 0.00003	-0.00158 ± 0.00174	0.000088 ± 0.000019	7.97E-15	98.6	19.27741	453.1 ± 2.1	0.46%
59	2.02595 ± 0.00177	0.12763 ± 0.00053	0.0015 ± 0.00003	0.00117 ± 0.00123	0.000055 ± 0.000019	8.62E-15	99.2	15.74645	378.2 ± 1.9	0.51%
60	1.90253 ± 0.00228	0.09732 ± 0.00034	0.0012 ± 0.00002	-0.00024 ± 0.00131	0.000049 ± 0.000023	8.10E-15	99.2	19.39858	455.6 ± 2.4	0.52%
61	2.87752 ± 0.00187	0.16234 ± 0.00053	0.0020 ± 0.00003	-0.00047 ± 0.00095	0.000076 ± 0.000012	1.22E-14	99.2	17.58565	417.6 ± 1.5	0.36%
62	1.27431 ± 0.00213	0.08303 ± 0.00029	0.0010 ± 0.00004	-0.00108 ± 0.00094	0.000032 ± 0.000010	5.42E-15	99.2	15.23126	367.0 ± 1.7	0.45%
63	1.15110 ± 0.00258	0.06095 ± 0.00017	0.0008 ± 0.00002	0.00383 ± 0.00163	0.000028 ± 0.000010	4.90E-15	99.3	18.75455	442.2 ± 2.0	0.45%
64	17.91439 ± 0.02368	0.91293 ± 0.00131	0.0114 ± 0.00008	0.02498 ± 0.00092	0.000320 ± 0.000016	7.63E-14	99.5	19.52211	458.2 ± 0.9	0.20%
65	1.46695 ± 0.00114	0.07389 ± 0.00033	0.0009 ± 0.00002	0.00268 ± 0.00110	0.000026 ± 0.000008	6.24E-15	99.5	19.75328	463.0 ± 2.2	0.49%
66	2.19749 ± 0.00183	0.12618 ± 0.00026	0.0016 ± 0.00002	0.00301 ± 0.00097	0.000126 ± 0.000013	9.35E-15	98.3	17.12181	407.7 ± 1.2	0.29%
67	1.52547 ± 0.00301	0.09581 ± 0.00030	0.0012 ± 0.00004	0.00530 ± 0.00107	0.000035 ± 0.000009	6.49E-15	99.4	15.81916	379.7 ± 1.6	0.42%
68	2.17532 ± 0.00263	0.11057 ± 0.00050	0.0014 ± 0.00003	0.00042 ± 0.00112	0.000042 ± 0.000012	9.26E-15	99.4	19.56330	459.0 ± 2.3	0.50%
69	2.07202 ± 0.00197	0.10348 ± 0.00031	0.0013 ± 0.00002	-0.00064 ± 0.00100	0.000171 ± 0.000011	8.82E-15	97.6	19.53335	458.4 ± 1.6	0.36%
70	0.67407 ± 0.00136	0.04233 ± 0.00028	0.0005 ± 0.00003	0.00035 ± 0.00125	0.000030 ± 0.000009	2.87E-15	98.7	15.71377	377.5 ± 3.0	0.81%
71	1.14524 ± 0.00309	0.06201 ± 0.00041	0.0007 ± 0.00002	0.00072 ± 0.00112	0.000019 ± 0.000009	4.88E-15	99.5	18.38194	434.4 ± 3.3	0.75%
72	3.82829 ± 0.00693	0.19387 ± 0.00084	0.0024 ± 0.00005	-0.00074 ± 0.00114	0.000044 ± 0.000010	1.63E-14	99.7	19.67901	461.4 ± 2.2	0.48%
73	2.15627 ± 0.00360	0.11534 ± 0.00044	0.0014 ± 0.00003	-0.00376 ± 0.00094	0.000028 ± 0.000010	9.18E-15	99.6	18.61928	439.4 ± 1.9	0.44%
74	1.05518 ± 0.00146	0.05366 ± 0.00033	0.0006 ± 0.00003	-0.00108 ± 0.00111	-0.000003 ± 0.000010	4.49E-15	100.1	19.66357	461.1 ± 3.2	0.69%
75	1.21807 ± 0.00274	0.06157 ± 0.00017	0.0008 ± 0.00002	-0.00012 ± 0.00147	0.000007 ± 0.000009	5.19E-15	99.8	19.74777	462.8 ± 1.9	0.42%
76	4.32625 ± 0.00348	0.25458 ± 0.00057	0.0031 ± 0.00004	-0.00112 ± 0.00109	0.000100 ± 0.000011	1.84E-14	99.3	16.87644	402.5 ± 1.0	0.25%
77	1.49871 ± 0.00212	0.09788 ± 0.00051	0.0012 ± 0.00003	-0.00292 ± 0.00116	0.000029 ± 0.000009	6.38E-15	99.4	15.22053	366.7 ± 2.1	0.58%
78	3.65082 ± 0.00173	0.18514 ± 0.00064	0.0023 ± 0.00004	-0.00182 ± 0.00135	0.000051 ± 0.000010	1.55E-14	99.6	19.63745	460.6 ± 1.6	0.36%
79	1.40331 ± 0.00222	0.08809 ± 0.00023	0.0011 ± 0.00003	-0.00286 ± 0.00131	0.000009 ± 0.000010	5.97E-15	99.8	15.89842	381.5 ± 1.4	0.37%
80	2.80303 ± 0.00432	0.14453 ± 0.00057	0.0017 ± 0.00002	-0.00326 ± 0.00197	0.000020 ± 0.000010	1.19E-14	99.8	19.35199	454.6 ± 2.0	0.44%
81	2.89313 ± 0.00276	0.16921 ± 0.00065	0.0021 ± 0.00003	-0.00108 ± 0.00131	0.000052 ± 0.000012	1.23E-14	99.5	17.00578	405.2 ± 1.7	0.41%
82	3.10251 ± 0.00264	0.15930 ± 0.00073	0.0019 ± 0.00002	-0.00101 ± 0.00156	0.000010 ± 0.000009	1.32E-14	99.9	19.45690	456.8 ± 2.2	0.47%
83	1.55189 ± 0.00177	0.07900 ± 0.00035	0.0010 ± 0.00002	-0.00245 ± 0.00168	0.000025 ± 0.000010	6.61E-15	99.5	19.54599	458.7 ± 2.3	0.50%
84	2.27096 ± 0.00232	0.16191 ± 0.00047	0.0020 ± 0.00004	0.00003 ± 0.00115	0.000085 ± 0.000011	9.67E-15	98.9	13.87151	337.1 ± 1.2	0.34%
85	3.14939 ± 0.00295	0.16170 ± 0.00039	0.0020 ± 0.00003	-0.00291 ± 0.00085	0.000028 ± 0.000010	1.34E-14	99.7	19.42312	456.1 ± 1.3	0.27%
86	3.66295 ± 0.00278	0.23257 ± 0.00048	0.0029 ± 0.00004	0.00066 ± 0.00116	0.000060 ± 0.000011	1.56E-14	99.5	15.67404	376.6 ± 0.9	0.24%
87	4.56057 ± 0.00259	0.23284 ± 0.00062	0.0028 ± 0.00005	-0.00014 ± 0.00161	0.000029 ± 0.000011	1.94E-14	99.8	19.54943	458.7 ± 1.3	0.28%
88	2.57473 ± 0.00271	0.16756 ± 0.00025	0.0020 ± 0.00004	0.00118 ± 0.00121	0.000081 ± 0.000012	1.10E-14	99.1	15.22389	366.8 ± 0.9	0.23%
89	5.85867 ± 0.00556	0.30056 ± 0.00061	0.0037 ± 0.00004	0.00007 ± 0.00145	0.000130 ± 0.000012	2.49E-14	99.3	19.36495	454.9 ± 1.1	0.23%
90	5.22432 ± 0.00291	0.25942 ± 0.00053	0.0033 ± 0.00005	0.00166 ± 0.00096	0.000491 ± 0.000013	2.22E-14	97.2	19.58021	459.4 ± 1.1	0.23%
91	3.04669 ± 0.00134	0.15714 ± 0.00063	0.0020 ± 0.00003	-0.00216 ± 0.00119	0.000193 ± 0.000013	1.30E-14	98.1	19.02397	447.8 ± 1.9	0.43%
92	4.05135 ± 0.00238	0.20775 ± 0.00036	0.0026 ± 0.00004	-0.00346 ± 0.00129	0.000065 ± 0.000010	1.72E-14	99.5	19.40722	455.8 ± 0.9	0.20%
93	3.85393 ± 0.00262	0.19157 ± 0.00057	0.0024 ± 0.00003	0.00202 ± 0.00138	0.000080 ± 0.000010	1.64E-14	99.4	19.99489	467.9 ± 1.5	0.32%
94	0.95707 ± 0.00130	0.06164 ± 0.00029	0.0008 ± 0.00002	0.00110 ± 0.00099	0.000018 ± 0.000010	4.07E-15	99.4	15.44015	371.5 ± 2.1	0.57%
95	2.11865 ± 0.00157	0.11009 ± 0.00060	0.0014 ± 0.00003	-0.00224 ± 0.00129	0.000007 ± 0.000012	9.02E-15	99.9	19.22357	452.0 ± 2.6	0.57%

96	1.81579 ± 0.00174	0.11498 ± 0.00020	0.0014 ± 0.00004	0.00009 ± 0.00151	0.000065 ± 0.000017	7.73E-15	98.9	15.62443	375.5 ± 1.3	0.34%
97	2.72841 ± 0.00261	0.13954 ± 0.00031	0.0017 ± 0.00003	-0.00340 ± 0.00136	0.000022 ± 0.000010	1.16E-14	99.8	19.50395	457.8 ± 1.2	0.27%
98	2.76585 ± 0.00241	0.14299 ± 0.00057	0.0018 ± 0.00003	-0.00202 ± 0.00145	0.000051 ± 0.000010	1.18E-14	99.5	19.23572	452.2 ± 1.9	0.42%
99	2.52094 ± 0.00221	0.12807 ± 0.00042	0.0016 ± 0.00004	0.00075 ± 0.00100	0.000065 ± 0.000011	1.07E-14	99.2	19.53503	458.4 ± 1.7	0.37%
100	2.76591 ± 0.00124	0.14278 ± 0.00044	0.0017 ± 0.00002	-0.00224 ± 0.00157	0.000008 ± 0.000010	1.18E-14	99.9	19.35490	454.7 ± 1.5	0.33%
101	0.87364 ± 0.00111	0.04044 ± 0.00010	0.0006 ± 0.00002	-0.00148 ± 0.00073	0.000254 ± 0.000012	3.72E-15	91.4	19.74307	462.7 ± 2.5	0.54%

au16.3e.mus (D2-S4) Mitchell Moore *j=0.00097397±0.000007 Grain Sizes = 0.177 - 0.42 mm*

#	40 V	39 V	38 V	37 V	36 V	Moles 40Ar*	%Rad	R	Age (Ma)	%-sd
1	1.81771 ± 0.00093	0.12043 ± 0.00055	0.0015 ± 0.00003	0.00319 ± 0.00125	0.000022 ± 0.000017	7.74E-15	99.7	15.04131	362.8 ± 1.9	0.54%
2	0.66666 ± 0.00108	0.04106 ± 0.00014	0.0005 ± 0.00002	0.00381 ± 0.00110	0.000025 ± 0.000009	2.84E-15	98.9	16.06233	385.0 ± 2.1	0.55%
3	2.72787 ± 0.00130	0.14861 ± 0.00067	0.0018 ± 0.00004	0.00004 ± 0.00133	0.000019 ± 0.000010	1.16E-14	99.8	18.31685	433.0 ± 2.0	0.46%
4	5.57285 ± 0.00413	0.35634 ± 0.00063	0.0045 ± 0.00004	0.00219 ± 0.00112	0.000046 ± 0.000009	2.37E-14	99.8	15.60186	375.0 ± 0.7	0.20%
5	1.23220 ± 0.00128	0.08678 ± 0.00044	0.0011 ± 0.00003	0.00313 ± 0.00107	0.000021 ± 0.000009	5.25E-15	99.5	14.13018	342.8 ± 1.9	0.56%
6	0.62165 ± 0.00139	0.03519 ± 0.00033	0.0004 ± 0.00001	0.00127 ± 0.00186	0.000032 ± 0.000009	2.65E-15	98.5	17.39962	413.6 ± 4.4	1.07%
7	2.28711 ± 0.00198	0.13698 ± 0.00053	0.0017 ± 0.00003	0.00112 ± 0.00175	0.000041 ± 0.000011	9.74E-15	99.5	16.60808	396.7 ± 1.7	0.43%
8	2.27268 ± 0.00165	0.12623 ± 0.00034	0.0015 ± 0.00002	-0.00239 ± 0.00184	0.000033 ± 0.000009	9.67E-15	99.6	17.92493	424.8 ± 1.3	0.30%
9	1.04548 ± 0.00137	0.06353 ± 0.00025	0.0008 ± 0.00002	0.00340 ± 0.00119	0.000071 ± 0.000009	4.45E-15	98.0	16.13187	386.5 ± 2.0	0.51%
10	1.09088 ± 0.00125	0.07034 ± 0.00021	0.0009 ± 0.00002	-0.00045 ± 0.00182	0.000050 ± 0.000009	4.64E-15	98.7	15.29889	368.4 ± 1.5	0.41%
11	1.91802 ± 0.00147	0.08632 ± 0.00029	0.0013 ± 0.00004	0.00033 ± 0.00159	0.001406 ± 0.000019	8.16E-15	78.3	17.40711	413.8 ± 2.4	0.59%
12	0.80397 ± 0.00168	0.04909 ± 0.00011	0.0006 ± 0.00002	0.00068 ± 0.00158	0.000001 ± 0.000011	3.42E-15	100.0	16.37603	391.8 ± 2.0	0.50%
13	1.39358 ± 0.00182	0.09207 ± 0.00048	0.0011 ± 0.00004	0.00020 ± 0.00135	-0.000001 ± 0.000011	5.93E-15	100.0	15.13567	364.9 ± 2.1	0.59%
14	1.08884 ± 0.00131	0.07291 ± 0.00029	0.0009 ± 0.00002	-0.00043 ± 0.00088	0.000025 ± 0.000008	4.64E-15	99.3	14.83309	358.3 ± 1.7	0.47%
15	2.48204 ± 0.00244	0.15255 ± 0.00042	0.0019 ± 0.00004	-0.00219 ± 0.00167	0.000027 ± 0.000012	1.06E-14	99.7	16.21656	388.3 ± 1.3	0.33%
16	1.58765 ± 0.00266	0.11755 ± 0.00042	0.0014 ± 0.00004	-0.00020 ± 0.00140	0.000016 ± 0.000011	6.76E-15	99.7	13.46491	328.0 ± 1.5	0.45%
17	0.98359 ± 0.00107	0.05977 ± 0.00038	0.0007 ± 0.00002	0.00284 ± 0.00121	0.000024 ± 0.000010	4.19E-15	99.3	16.34293	391.0 ± 2.8	0.72%
18	2.46097 ± 0.00233	0.14249 ± 0.00058	0.0017 ± 0.00004	0.00212 ± 0.00176	0.000039 ± 0.000010	1.05E-14	99.5	17.19233	409.2 ± 1.8	0.44%
19	2.00261 ± 0.00123	0.12142 ± 0.00016	0.0015 ± 0.00003	0.00029 ± 0.00102	0.000026 ± 0.000012	8.52E-15	99.6	16.43072	392.9 ± 0.9	0.23%
20	0.41635 ± 0.00044	0.02722 ± 0.00010	0.0003 ± 0.00001	0.00132 ± 0.00132	0.000009 ± 0.000011	1.77E-15	99.4	15.20787	366.5 ± 3.1	0.85%
21	1.64289 ± 0.00152	0.09219 ± 0.00026	0.0012 ± 0.00002	0.00051 ± 0.00105	0.000043 ± 0.000009	6.99E-15	99.2	17.68471	419.7 ± 1.4	0.34%
22	0.83055 ± 0.00183	0.04954 ± 0.00029	0.0006 ± 0.00002	0.00137 ± 0.00145	-0.000001 ± 0.000016	3.54E-15	100.1	16.76680	400.1 ± 3.3	0.84%
23	0.62395 ± 0.00096	0.04472 ± 0.00013	0.0005 ± 0.00002	-0.00177 ± 0.00089	0.000032 ± 0.000009	2.66E-15	98.5	13.73952	334.1 ± 1.8	0.54%
24	0.50350 ± 0.00086	0.03394 ± 0.00017	0.0004 ± 0.00003	0.00054 ± 0.00115	-0.000011 ± 0.000013	2.14E-15	100.6	14.83441	358.3 ± 3.4	0.95%
25	0.47630 ± 0.00066	0.02995 ± 0.00013	0.0004 ± 0.00002	-0.00397 ± 0.00153	0.000030 ± 0.000009	2.03E-15	98.2	15.59610	374.9 ± 2.8	0.75%
26	0.18136 ± 0.00052	0.01147 ± 0.00010	0.0002 ± 0.00002	0.00211 ± 0.00110	0.000003 ± 0.000009	7.72E-16	99.7	15.76616	378.6 ± 6.8	1.81%
27	1.12698 ± 0.00161	0.07106 ± 0.00037	0.0008 ± 0.00002	-0.00151 ± 0.00121	0.000020 ± 0.000009	4.80E-15	99.5	15.77551	378.8 ± 2.2	0.59%
28	2.51247 ± 0.00221	0.15218 ± 0.00057	0.0019 ± 0.00003	0.00162 ± 0.00158	0.000008 ± 0.000010	1.07E-14	99.9	16.49466	394.3 ± 1.6	0.40%
29	1.61970 ± 0.00204	0.10602 ± 0.00046	0.0014 ± 0.00002	0.00033 ± 0.00125	0.000017 ± 0.000009	6.89E-15	99.7	15.23155	367.0 ± 1.8	0.49%

30	0.60559 ± 0.00123	0.04440 ± 0.00016	0.0006 ± 0.00003	0.01201 ± 0.00274	0.000002 ± 0.000009	2.58E-15	100.1	13.65076	332.2 ± 2.0	0.62%
31	1.74537 ± 0.00202	0.11517 ± 0.00046	0.0014 ± 0.00002	-0.00101 ± 0.00068	0.000023 ± 0.000010	7.43E-15	99.6	15.09472	364.0 ± 1.7	0.45%
32	0.33639 ± 0.00033	0.02004 ± 0.00010	0.0003 ± 0.00002	0.00195 ± 0.00122	0.000008 ± 0.000009	1.43E-15	99.3	16.67809	398.2 ± 3.7	0.92%
33	0.67199 ± 0.00109	0.03725 ± 0.00022	0.0005 ± 0.00003	0.00109 ± 0.00148	-0.000001 ± 0.000010	2.86E-15	100.1	18.04242	427.2 ± 3.2	0.75%
34	0.70950 ± 0.00084	0.05151 ± 0.00028	0.0006 ± 0.00002	0.00025 ± 0.00148	-0.000001 ± 0.000010	3.02E-15	100.0	13.77342	334.9 ± 2.3	0.69%
35	1.62284 ± 0.00156	0.10367 ± 0.00035	0.0012 ± 0.00003	-0.00195 ± 0.00086	0.000012 ± 0.000009	6.91E-15	99.8	15.61783	375.4 ± 1.4	0.39%
36	0.21075 ± 0.00062	0.00949 ± 0.00006	0.0002 ± 0.00002	-0.00259 ± 0.00100	0.000183 ± 0.000011	8.97E-16	74.4	16.48889	394.2 ± 9.0	2.27%
37	1.46953 ± 0.00206	0.09293 ± 0.00035	0.0012 ± 0.00003	0.00236 ± 0.00103	0.000032 ± 0.000010	6.26E-15	99.4	15.71254	377.4 ± 1.7	0.45%
38	1.21179 ± 0.00086	0.07496 ± 0.00027	0.0010 ± 0.00002	-0.00195 ± 0.00151	0.000029 ± 0.000010	5.16E-15	99.3	16.04938	384.7 ± 1.7	0.44%
39	0.87919 ± 0.00141	0.05057 ± 0.00022	0.0006 ± 0.00003	-0.00107 ± 0.00122	0.000032 ± 0.000010	3.74E-15	98.9	17.19820	409.3 ± 2.4	0.58%
40	0.43757 ± 0.00042	0.02419 ± 0.00010	0.0003 ± 0.00002	-0.00250 ± 0.00164	0.000006 ± 0.000010	1.86E-15	99.6	18.00776	426.5 ± 3.5	0.81%
41	1.65013 ± 0.00149	0.09820 ± 0.00057	0.0012 ± 0.00002	0.00194 ± 0.00115	0.000030 ± 0.000009	7.02E-15	99.5	16.71470	399.0 ± 2.4	0.61%
42	1.16918 ± 0.00127	0.08570 ± 0.00029	0.0010 ± 0.00003	0.00006 ± 0.00115	0.000042 ± 0.000009	4.98E-15	98.9	13.49753	328.8 ± 1.4	0.43%
43	1.24925 ± 0.00112	0.09328 ± 0.00044	0.0011 ± 0.00002	-0.00013 ± 0.00137	0.000061 ± 0.000008	5.32E-15	98.6	13.20048	322.1 ± 1.7	0.52%
44	2.26937 ± 0.00130	0.14970 ± 0.00061	0.0018 ± 0.00003	0.00181 ± 0.00132	0.000043 ± 0.000010	9.66E-15	99.4	15.07488	363.6 ± 1.6	0.43%
45	1.08691 ± 0.00187	0.06869 ± 0.00026	0.0008 ± 0.00002	-0.00142 ± 0.00140	0.000027 ± 0.000008	4.63E-15	99.3	15.70624	377.3 ± 1.8	0.47%
46	1.25539 ± 0.00180	0.07907 ± 0.00032	0.0009 ± 0.00003	0.00095 ± 0.00110	0.000025 ± 0.000008	5.34E-15	99.4	15.78359	379.0 ± 1.8	0.48%
47	2.25944 ± 0.00330	0.14564 ± 0.00064	0.0018 ± 0.00004	-0.00184 ± 0.00116	0.000025 ± 0.000009	9.62E-15	99.7	15.46269	372.0 ± 1.8	0.48%
48	1.94091 ± 0.00088	0.12716 ± 0.00033	0.0015 ± 0.00002	-0.00169 ± 0.00127	0.000052 ± 0.000009	8.26E-15	99.2	15.14086	365.0 ± 1.1	0.30%
49	0.50154 ± 0.00101	0.03324 ± 0.00016	0.0004 ± 0.00001	0.00094 ± 0.00120	0.000015 ± 0.000009	2.14E-15	99.2	14.96290	361.1 ± 2.6	0.73%
50	1.55893 ± 0.00226	0.09915 ± 0.00044	0.0012 ± 0.00002	0.00330 ± 0.00112	0.000012 ± 0.000008	6.64E-15	99.8	15.68867	376.9 ± 1.9	0.50%
51	1.15885 ± 0.00139	0.06953 ± 0.00024	0.0008 ± 0.00002	-0.00415 ± 0.00118	0.000013 ± 0.000008	4.93E-15	99.7	16.60449	396.7 ± 1.7	0.42%
52	0.83938 ± 0.00106	0.05433 ± 0.00021	0.0006 ± 0.00003	-0.00168 ± 0.00224	0.000016 ± 0.000009	3.57E-15	99.4	15.35773	369.7 ± 1.9	0.52%
53	2.01013 ± 0.00193	0.13116 ± 0.00029	0.0016 ± 0.00004	0.00247 ± 0.00158	0.000008 ± 0.000009	8.56E-15	99.9	15.31033	368.7 ± 1.0	0.27%
54	0.49532 ± 0.00105	0.03117 ± 0.00011	0.0004 ± 0.00002	-0.00206 ± 0.00149	0.000014 ± 0.000009	2.11E-15	99.2	15.75225	378.3 ± 2.6	0.69%
55	0.78844 ± 0.00077	0.05172 ± 0.00021	0.0006 ± 0.00003	0.00140 ± 0.00179	-0.000001 ± 0.000009	3.36E-15	100.0	15.24733	367.3 ± 2.0	0.53%
56	1.02121 ± 0.00145	0.06318 ± 0.00032	0.0008 ± 0.00004	-0.00053 ± 0.00149	0.000037 ± 0.000009	4.35E-15	98.9	15.98814	383.4 ± 2.3	0.60%
57	1.39861 ± 0.00156	0.07189 ± 0.00022	0.0009 ± 0.00003	-0.00148 ± 0.00099	0.000212 ± 0.000012	5.95E-15	95.5	18.58300	438.6 ± 1.9	0.44%
58	1.79930 ± 0.00212	0.11381 ± 0.00065	0.0014 ± 0.00003	-0.00327 ± 0.00133	0.000023 ± 0.000009	7.66E-15	99.6	15.74875	378.2 ± 2.3	0.60%
59	0.48184 ± 0.00083	0.02897 ± 0.00015	0.0004 ± 0.00002	-0.00204 ± 0.00130	0.000014 ± 0.000009	2.05E-15	99.1	16.48282	394.0 ± 3.0	0.77%
60	1.44763 ± 0.00080	0.08697 ± 0.00037	0.0011 ± 0.00002	0.00007 ± 0.00130	0.000037 ± 0.000014	6.16E-15	99.2	16.52060	394.9 ± 2.1	0.52%
61	2.64010 ± 0.00205	0.14126 ± 0.00060	0.0018 ± 0.00003	0.00347 ± 0.00116	0.000044 ± 0.000017	1.12E-14	99.5	18.59963	438.9 ± 2.1	0.48%
62	1.28961 ± 0.00165	0.09476 ± 0.00033	0.0012 ± 0.00003	0.00353 ± 0.00096	0.000042 ± 0.000010	5.49E-15	99.1	13.48144	328.4 ± 1.5	0.44%
63	0.30947 ± 0.00042	0.02191 ± 0.00012	0.0003 ± 0.00002	-0.00137 ± 0.00121	0.000044 ± 0.000012	1.32E-15	95.8	13.52940	329.5 ± 4.3	1.32%
64	1.16299 ± 0.00102	0.08440 ± 0.00039	0.0010 ± 0.00002	0.00190 ± 0.00098	0.000019 ± 0.000010	4.95E-15	99.5	13.71362	333.6 ± 1.8	0.53%
65	0.71721 ± 0.00091	0.04746 ± 0.00026	0.0006 ± 0.00002	0.00130 ± 0.00143	0.000017 ± 0.000010	3.05E-15	99.3	15.00742	362.1 ± 2.5	0.70%
66	0.28752 ± 0.00036	0.01813 ± 0.00009	0.0002 ± 0.00003	-0.00218 ± 0.00127	0.000009 ± 0.000011	1.22E-15	99.1	15.70662	377.3 ± 4.6	1.22%
67	0.88251 ± 0.00175	0.05085 ± 0.00018	0.0006 ± 0.00003	-0.00003 ± 0.00122	0.000026 ± 0.000010	3.76E-15	99.1	17.20042	409.4 ± 2.2	0.53%
68	0.61625 ± 0.00038	0.04258 ± 0.00023	0.0005 ± 0.00002	0.00218 ± 0.00137	0.000046 ± 0.000009	2.62E-15	97.8	14.15564	343.4 ± 2.5	0.72%

69	2.48439 ± 0.00144	0.16833 ± 0.00045	0.0021 ± 0.00002	-0.00044 ± 0.00088	0.000175 ± 0.000011	1.06E-14	97.9	14.45056	349.9 ± 1.1	0.31%
70	2.21570 ± 0.00166	0.13709 ± 0.00039	0.0017 ± 0.00003	0.00010 ± 0.00089	0.000046 ± 0.000010	9.43E-15	99.4	16.06411	385.0 ± 1.2	0.32%
71	0.36337 ± 0.00043	0.02378 ± 0.00013	0.0003 ± 0.00001	-0.00149 ± 0.00198	0.000021 ± 0.000010	1.55E-15	98.3	15.01617	362.3 ± 3.8	1.04%
72	0.82743 ± 0.00099	0.05464 ± 0.00018	0.0007 ± 0.00003	-0.00137 ± 0.00116	0.000050 ± 0.000010	3.52E-15	98.2	14.86785	359.0 ± 1.8	0.51%
73	2.46033 ± 0.00242	0.16976 ± 0.00049	0.0021 ± 0.00004	0.00028 ± 0.00079	0.000018 ± 0.000010	1.05E-14	99.8	14.46167	350.1 ± 1.2	0.33%
74	0.23435 ± 0.00040	0.01221 ± 0.00009	0.0002 ± 0.00002	0.00075 ± 0.00076	0.000018 ± 0.000010	9.98E-16	97.8	18.77364	442.6 ± 6.6	1.48%
75	1.48465 ± 0.00239	0.09713 ± 0.00040	0.0011 ± 0.00003	0.00411 ± 0.00159	0.000029 ± 0.000009	6.32E-15	99.4	15.20032	366.3 ± 1.8	0.48%
76	2.56638 ± 0.00174	0.14662 ± 0.00064	0.0018 ± 0.00004	-0.00067 ± 0.00124	0.000026 ± 0.000010	1.09E-14	99.7	17.45149	414.7 ± 1.9	0.46%
77	1.82537 ± 0.00192	0.11354 ± 0.00066	0.0014 ± 0.00004	0.00004 ± 0.00142	0.000024 ± 0.000011	7.77E-15	99.6	16.01473	384.0 ± 2.4	0.63%
78	0.95754 ± 0.00098	0.06255 ± 0.00025	0.0009 ± 0.00003	-0.00210 ± 0.00125	0.000021 ± 0.000009	4.08E-15	99.4	15.20655	366.4 ± 1.8	0.50%
79	2.30554 ± 0.00181	0.14465 ± 0.00054	0.0018 ± 0.00003	0.00220 ± 0.00103	-0.000012 ± 0.000010	9.81E-15	100.2	15.94060	382.4 ± 1.5	0.40%
80	0.91178 ± 0.00159	0.05343 ± 0.00040	0.0007 ± 0.00002	0.00165 ± 0.00154	0.000062 ± 0.000010	3.88E-15	98.0	16.72512	399.2 ± 3.4	0.86%
81	1.07863 ± 0.00132	0.05797 ± 0.00018	0.0007 ± 0.00002	0.00352 ± 0.00114	-0.000047 ± 0.000010	4.59E-15	101.3	18.61380	439.2 ± 1.9	0.44%
82	0.83537 ± 0.00151	0.04404 ± 0.00039	0.0006 ± 0.00002	0.00365 ± 0.00083	-0.000029 ± 0.000010	3.56E-15	101.1	18.97747	446.8 ± 4.3	0.96%
83	1.48867 ± 0.00130	0.09540 ± 0.00035	0.0012 ± 0.00003	0.00636 ± 0.00202	-0.000044 ± 0.000009	6.34E-15	100.9	15.61118	375.2 ± 1.6	0.42%
84	0.46421 ± 0.00061	0.02851 ± 0.00014	0.0003 ± 0.00002	-0.00085 ± 0.00074	0.000020 ± 0.000010	1.98E-15	98.7	16.06857	385.1 ± 3.2	0.83%
85	1.21782 ± 0.00180	0.07535 ± 0.00021	0.0009 ± 0.00003	0.00080 ± 0.00176	0.000017 ± 0.000011	5.18E-15	99.6	16.09828	385.8 ± 1.6	0.41%
86	0.68066 ± 0.00100	0.03642 ± 0.00014	0.0004 ± 0.00002	-0.00180 ± 0.00167	0.000010 ± 0.000009	2.90E-15	99.6	18.60676	439.1 ± 2.5	0.57%
87	0.43485 ± 0.00056	0.02325 ± 0.00009	0.0003 ± 0.00002	0.00092 ± 0.00214	0.000070 ± 0.000010	1.85E-15	95.3	17.82135	422.6 ± 3.4	0.80%
88	0.63221 ± 0.00101	0.03987 ± 0.00025	0.0005 ± 0.00002	-0.00406 ± 0.00116	-0.000001 ± 0.000009	2.69E-15	100.0	15.84668	380.3 ± 3.0	0.79%
89	2.53859 ± 0.00296	0.13992 ± 0.00022	0.0017 ± 0.00004	-0.00360 ± 0.00148	0.000103 ± 0.000010	1.08E-14	98.8	17.92452	424.7 ± 1.0	0.23%
90	0.87521 ± 0.00165	0.05733 ± 0.00021	0.0006 ± 0.00003	-0.00374 ± 0.00075	0.000028 ± 0.000010	3.73E-15	99.1	15.11741	364.5 ± 2.0	0.55%
91	1.74691 ± 0.00241	0.10849 ± 0.00059	0.0013 ± 0.00003	-0.00277 ± 0.00124	0.000035 ± 0.000010	7.44E-15	99.4	16.00616	383.8 ± 2.3	0.59%
92	2.08203 ± 0.00207	0.10986 ± 0.00047	0.0014 ± 0.00003	0.00102 ± 0.00139	0.000026 ± 0.000009	8.86E-15	99.6	18.88371	444.9 ± 2.1	0.46%
93	0.53097 ± 0.00105	0.03055 ± 0.00013	0.0004 ± 0.00003	-0.00112 ± 0.00108	0.000043 ± 0.000012	2.26E-15	97.6	16.96595	404.4 ± 3.4	0.83%
94	1.49804 ± 0.00101	0.09019 ± 0.00068	0.0011 ± 0.00003	-0.00204 ± 0.00195	0.000040 ± 0.000008	6.38E-15	99.2	16.47641	393.9 ± 3.1	0.78%
95	1.37130 ± 0.00096	0.09334 ± 0.00030	0.0011 ± 0.00003	-0.00011 ± 0.00176	0.000035 ± 0.000009	5.84E-15	99.2	14.58026	352.7 ± 1.3	0.38%
96	1.83204 ± 0.00161	0.11477 ± 0.00054	0.0014 ± 0.00003	-0.00054 ± 0.00100	0.000056 ± 0.000010	7.80E-15	99.1	15.81684	379.7 ± 2.0	0.51%
97	1.21477 ± 0.00098	0.08528 ± 0.00044	0.0010 ± 0.00003	-0.00261 ± 0.00101	0.000041 ± 0.000010	5.17E-15	99.0	14.09806	342.1 ± 2.0	0.58%
98	0.95717 ± 0.00113	0.06144 ± 0.00039	0.0008 ± 0.00003	0.00169 ± 0.00146	0.000033 ± 0.000010	4.07E-15	99.0	15.42343	371.2 ± 2.7	0.72%
99	0.92966 ± 0.00206	0.06477 ± 0.00037	0.0008 ± 0.00003	0.00355 ± 0.00121	0.000030 ± 0.000011	3.96E-15	99.1	14.21919	344.8 ± 2.4	0.71%
100	0.82780 ± 0.00157	0.05321 ± 0.00028	0.0007 ± 0.00003	0.00147 ± 0.00066	0.000030 ± 0.000012	3.52E-15	98.9	15.39027	370.4 ± 2.6	0.70%
101	0.93897 ± 0.00158	0.06268 ± 0.00025	0.0008 ± 0.00003	-0.00460 ± 0.00139	0.000007 ± 0.000010	4.00E-15	99.8	14.93860	360.6 ± 1.9	0.53%
102	1.76465 ± 0.00113	0.11122 ± 0.00035	0.0014 ± 0.00004	0.00032 ± 0.00087	0.000060 ± 0.000010	7.51E-15	99.0	15.70886	377.3 ± 1.4	0.36%
103	2.05246 ± 0.00281	0.10632 ± 0.00044	0.0013 ± 0.00002	-0.00096 ± 0.00142	0.000092 ± 0.000009	8.74E-15	98.7	19.04819	448.3 ± 2.1	0.47%
104	2.18147 ± 0.00200	0.14784 ± 0.00066	0.0018 ± 0.00002	0.00190 ± 0.00174	0.000033 ± 0.000010	9.29E-15	99.6	14.69027	355.1 ± 1.7	0.47%
105	1.56731 ± 0.00177	0.09776 ± 0.00031	0.0012 ± 0.00003	-0.00005 ± 0.00177	0.000046 ± 0.000008	6.67E-15	99.1	15.89313	381.3 ± 1.4	0.38%
106	0.93235 ± 0.00077	0.05044 ± 0.00012	0.0007 ± 0.00002	0.00052 ± 0.00111	0.000019 ± 0.000009	3.97E-15	99.4	18.37589	434.3 ± 1.6	0.38%
107	2.01104 ± 0.00238	0.12394 ± 0.00075	0.0015 ± 0.00004	0.00165 ± 0.00152	0.000024 ± 0.000010	8.56E-15	99.7	16.17038	387.3 ± 2.5	0.64%