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K-Ar AGES OF LATE CENOZOIC BASALTS FROM THE WESTERN SNAKE RIVER PLAIN, IDAHO

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The western Snake River Plain, like its eastern counterpart, is covered with Cenozoic basaltic lava flows and continental clastic sediments. Volcanic activity within the western Snake River Plain began at about 13 Ma (Armstrong, et.al., 1975; Hart, et.al., 1984), and continued to as recently as 0.47 Ma (Amini, 1983).

Malde and Powers (1962) have broadly divided the upper Cenozoic volcanic and continental detrital rocks, in the western Snake River Plain, into four units. These units in an ascending stratigraphic order are: 1) an unnamed sequence of Miocene age basaltic and siliceous volcanics interbedded with detrital continental rocks, 2) a sequence (> 1000 m thick) of lower Pliocene siliceous Idavada Volcanics, 3) the lower Pliocene to middle Pleistocene Idaho Group, and 4) the upper Pleistocene Snake River Group consisting mainly of several locally extensive formations of basaltic rocks and fluvial gravel.

Formations of the Idaho Group, which occupy the central low lands of the western Snake River Plain, comprise a sequence of clastic continental beds intercalated with basaltic flows, and reach nearly 1500 m in thickness. The formations in ascending stratigraphic order are: the Poison Creek Formation, Banbury Basalt, Chalk Hills Formation, Glens Ferry Formation, Tuana Gravel, Bruneau Formation, and Black Mesa Gravel (Malde and Powers, 1962). These formations are exposed in a discontinuous fashion along the Snake River and its tributaries, from Hagerman down stream to the Idaho-Oregon border. K-Ar ages reported here are from geochronological, paleomagnetic, and petrological studies of the Bruneau Formation (Amini, 1983).

The Bruneau Formation is the result of the deposition of laterally juxtaposed and stratigraphically superposed sedimentary and volcanic units. This material was deposited in a series of canyons, roughly parallel to the present course of the Snake River, which was cut in the Glens Ferry Formation and its overlying Tuana Gravel (Malde, 1965; Amini, 1983). Everenden, et.al. (1964) dated a whole rock basalt sample (sample KA-1188) from the Berry Ranch Basalt, at 1.36 Ma. This date is in a good agreement with the 1.35 Ma age for the Deadman Canyon lava provided by Armstrong, et.al. (1975).

Results

We report here 39 new K-Ar dates for basaltic flows and pillow lavas from the area between Black Butte and Guffey Butte (figure 1), where abundant lava flows and lacustrine sedimentary deposits of the Bruneau Formation are present.

In order to achieve realistic ages that would fit the stratigraphic and paleomagnetic relationships of the lava flows general attempts have been made to eliminate the sources of the errors that are commonly encountered while dating the young, glass-rich, basaltic flows. Twenty-three of the reported ages are duplicated, from which nineteen ages are erroneous and would not fit the stratigraphic position. These ages were obtained by fusion of chunks of uncrushed samples. Acceptable ages were obtained from samples which prior to fusion were ground and fractions between 10- and 30-mesh size were selected and treated with con-

centrated acetic acid and washed and dried in room temperatures (Baksi, 1974).

From reported ages sample 79H3A which was collected from the Tad Pole Lake Basalt reveals a 0.47 ± 0.07 Ma which belongs to the Snake River Group Basalts, and sample 80H9-1 collected from top of the Fossil Butte which reveals a 7.07 ± 0.76 Ma and belongs to an older episode of volcanism, probably of the Banbury Basalt or older. Remaining ages reflect a stratigraphic interval ranging from upper Glens Ferry to the post Bruneau time. Erroneous ages were eliminated based on the fact that the Bruneau basalts sit above the Glens Ferry (Hagerman Fauna) dated at 3.7 ± 0.3 Ma and are all of reversed polarity of Matuyama age (2.1–0.7 Ma).

Constants used in calculating the ages are: $\lambda_{\beta} = 4.962 \times 10^{-10} \text{ Yr}^{-1}$; $\lambda_{\epsilon + \epsilon'} = 0.581 \times 10^{-10} \text{ Yr}^{-1}$; $40_{\text{K/K}} = 1.167 \times 10^{-2}$ moles/mole of K. From Stieger and Jager (1977).

SAMPLE DESCRIPTIONS

- 79H1A** K-Ar
Big Foot Butte pillow lava ($43^{\circ}08'30''\text{N}, 116^{\circ}18'\text{W}$; NE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ S26,T3S,R1E; elevation 2575', Wild Horse Butte 7.5' quad, Ada Co., ID). Porphyritic basalt, glomeroporphyritic clumps of plagioclase (up to 1.5 mm) and olivine (up to 1.2 mm), some are resorbed. Interstitial material are abundant plagioclase and olivine microcrysts in a hyalopilitic glassy mesostasis containing needle-like augite microlites. *Analytical data:* K = 0.722%; $^{40}\text{Ar}^*$ = 2.6884×10^{-12} moles/g; $^{40}\text{Ar}^*$ = 6.48%. *Comment:* Age is discordant with respect to its stratigraphic setting.
(whole rock) 2.14 ± 0.15 Ma
- 791A2** K-Ar
Big Foot Butte pillow lava, same as 79H1A (above). *Analytical data:* K = 0.7014%; $^{40}\text{Ar}^*$ = 3.1069×10^{-12} moles/g; $^{40}\text{Ar}^*$ = 5.35%. *Comment:* Age is too old and discordant.
(whole rock) 2.55 ± 0.21 Ma
- 79H1A1** K-Ar
Big Foot Butte pillow lava, same as 79H1A (above). *Analytical data:* K = 0.722%; $^{40}\text{Ar}^*$ = 1.191×10^{-2} moles/g; $^{40}\text{Ar}^*$ = 13.13%.
(whole rock) 0.95 ± 0.04 Ma
- 79H2-2** K-Ar
Big Foot Butte Basalt ($43^{\circ}08'15''\text{N}, 116^{\circ}16'15''\text{W}$; NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ S30,T3S,R2E; elevation 2925' Wild Horse Butte 7.5' quad, Ada Co., ID). Fine-grained, holocrystalline, with patches of Ti-rich ophitic augite. Microphenocrysts of plagioclase (up to 0.9 mm) and olivine are mostly resorbed. *Analytical data:* K = 0.581%; $^{40}\text{Ar}^*$ = 9.033×10^{-12} moles/g; $^{40}\text{Ar}^*$ = 4.86%. *Comment:* Age is discordant and does not fit its stratigraphic setting.
(whole rock) 8.94 ± 0.84 Ma

5. **79H2** K-Ar
Big Foot Butte Basalt, same as 79H2-2 (above).
Analytical data: K = 0.419%; $^{40}\text{Ar}^*$ = 1.146×10^{-12} moles/g; $^{40}\text{Ar}^*$ = 5.37%.
(whole rock) 1.57 ± 0.16 Ma
6. **79H3A** K-Ar
Tad Pole Lake Basalt ($43^\circ 7' 30''\text{N}$, $116^\circ 8' 45''\text{W}$; NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ S36,T3S,R2E; elevation 2950', Big Foot Butte 7 $\frac{1}{2}$ ' quad, Ada Co., ID). Very-fresh, fine to medium-grained subophitic Ti-rich augite and plagioclase (microphenocrysts of plagioclase up to 1.8 mm) and fresh olivine (up to 0.7 mm); interstitial oxide-rich mesostasis. *Analytical data:* K = 0.884%; $^{40}\text{Ar}^*$ = 0.7210×10^{-12} moles/g; $^{40}\text{Ar}^*$ = 2.72%.
(whole rock) 0.47 ± 0.07 Ma
7. **79H4-2** K-Ar
Basalt from Black Butte area ($43^\circ 05' 45''\text{N}$, $116^\circ 11'\text{W}$; NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ S11,T4S,R2E; ele-

vation 2640' Jackass Butte 7 $\frac{1}{2}$ ' quad, Ada Co., ID). Glomeroporphyritic clumps of plagioclase and olivine in a hyalopilitic glassy mesostasis of needle-like augite and oxide microlites. *Analytical data:* K = 0.415; $^{40}\text{Ar}^*$ = 0.807×10^{-12} moles/g; $^{40}\text{Ar}^*$ = 7.95%.
Comment: Age is discordant; it is too young, possibly due to argon loss.

(whole rock) 1.12 ± 0.06 Ma

8. **79H5-7** K-Ar
Basalt from plug of the Montini Volcano ($43^\circ 11' 15''\text{N}$, $116^\circ 23'\text{W}$; NW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ S6,T3S,R1E; elevation 2550', Sinker Butte 7 $\frac{1}{2}$ ' quad, Owyhee Co., ID). Fine to medium-grained equigranular subophitic titanogaugite and plagioclase; intergranular olivine, interstitial oxide-rich mesostasis. *Analytical data:* K = 0.606%; $^{40}\text{Ar}^*$ = 1.72327×10^{-12} moles/g; $^{40}\text{Ar}^*$ = 4.03%.
(whole rock) 1.64 ± 0.18 Ma

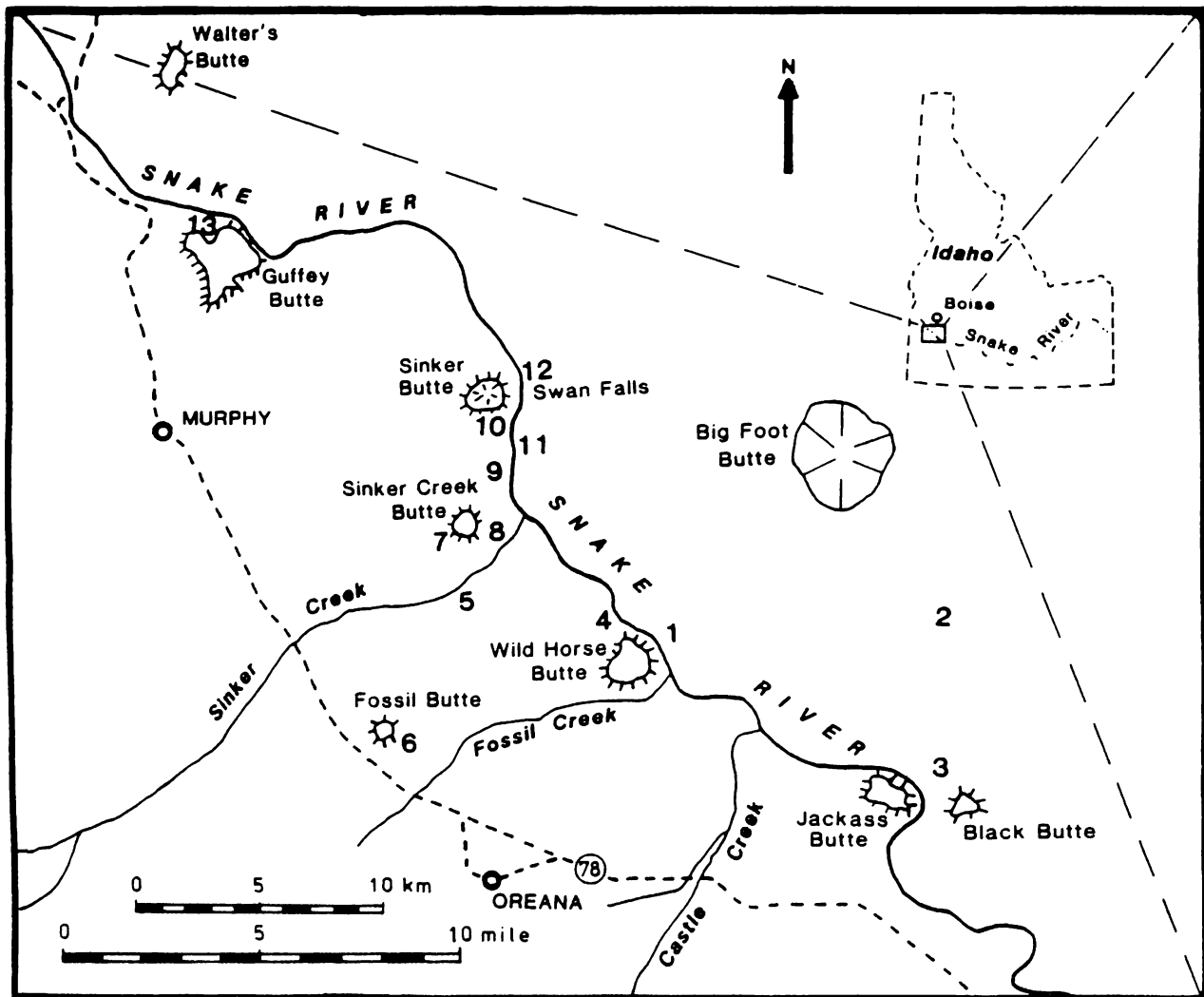


FIGURE 1. Index map showing location of sampling sites. Sample locations are numbered and correspond to: 1 = Big Foot Butte pillow lava, 79H1A, 79HA2, 79H1A1; 2 = Tadpole Lake Basalt, 79H3A; 3 = Black Butte area, 79H4-2, 80H1, 80H4; 4 = Wild Horse Butte Basalt, 79H9, 79H9-1; 5 = Emmigrant Basalt, 79H8, 79H8-5; 6 = Fossil Butte Basalt, 80H9, 80H9-1; 7 = Basalt from top of the Sinker Creek Butte, 80H7, 80H7-1, 8 = Otter Basalt, 79H6-6, 79H7, 79H7-2; Montini Basalt, 80H19, 80H20; 9 = Montini Basalt, 79H5-7; 10 = Swan Falls Reservoir Basalt, 80H16, 80H17, 80H18; 11 = Promontory location 80H14, 80H15; 12 = Swan Falls area, 80H11, 80H12, 80H13; 13 = Guffey Butte Basalt, 79H10-1, 79H10-7.

9. **79H6-6** K-Ar
Otter Basalt (43°11'N, 116°23'30''W; SE¼SW¼ NE¼SW¼ S7,T3S,R1E; elevation 2500', Sinker Butte 1/24000, Owyhee Co., ID). Porphyritic basalt intergranular, diktitaxitic olivine microphenocrysts are resorbed and some are serpentinized, subhedral plagioclase microphenocrysts. Interstitial plagioclase, olivine, augite, and oxide mesostasis. *Analytical data:* K = 0.448%; ⁴⁰Ar* = 3.255 moles/g; ⁴⁰Ar* = 1.17%. *Comment:* Age is too old and does not represent its stratigraphic setting.
(whole rock) **4.18 ± 1.67 Ma**
10. **79H7-2** K-Ar
Otter Basalt (43°11'N, 116°23'30''W; SE¼SW¼ NE¼SW¼ S7,T3S,R1E; elevation 2570' Sinker Butte 7½' quad, Owyhee Co., ID). Fine to medium-grained subophitic titanogaugite and plagioclase, euhedral olivine phenocrysts, interstitial oxide-rich mesostasis. *Analytical data:* K = 0.390; ⁴⁰Ar* = 0.6830 × 10⁻¹² moles/g; ⁴⁰Ar* = 5.78%. *Comment:* Age is discordant with respect to its stratigraphic setting.
(whole rock) **1.01 ± 0.08 Ma**
11. **79H7** K-Ar
Otter Basalt, same as 79H7-2 (above). *Analytical data:* K = 0.365%; ⁴⁰Ar* = 0.7772 × 10⁻¹² moles/g; ⁴⁰Ar* = 13.67%. *Comment:* Age is too young and does not represent the stratigraphic setting.
(whole rock) **1.23 ± 0.05 Ma**
12. **79H8-5** K-Ar
Emmigrant Basalt (43°11'N, 116°24'30''W; NE¼NW¼ NW¼SW¼ S12,T3S,R1W; elevation 2925', Sinker Butte 7½' quad, Owyhee Co., ID). Fine-grained, porphyritic basalt contains glomeroporphyritic clumps of plagioclase (up to 2 mm long) and olivine. Interstitial material are composed of plagioclase, titanogaugite, olivine and oxide mesostasis. *Analytical data:* K = 0.598%; ⁴⁰Ar* = 0.957 × 10⁻¹² moles/g; ⁴⁰Ar* = 7.23%.
(whole rock) **0.92 ± 0.05 Ma**
13. **79H8** K-Ar
Emmigrant Basalt, same as 79H8-5 (above). *Analytical data:* K = 0.556%; ⁴⁰Ar* = 1.462 × 10⁻¹² moles/g; ⁴⁰Ar* = 10.27%. *Comment:* Age is discordant with respect to its stratigraphic setting.
(whole rock) **1.52 ± 0.07 Ma**
14. **79H9-1** K-Ar
Wild Horse Butte Basalt (43°9'N, 116°21'W; NE¼NE¼ NW¼NW¼ S21,T3S,R1E; elevation 2680', Wild Horse Butte 7½' quad, Owyhee Co., ID). Interstitial, hyalopilitic, glomeroporphyritic clumps of plagioclase and olivine, interstitial material of curious titanogaugite and oxide-rich glassy mesostasis. *Analytical data:* K = 0.440%; ⁴⁰Ar* = 2.960 × 10⁻¹² moles/g; ⁴⁰Ar* = 7.07%. *Comment:* Age is discordant; too old due to excess argon.
(whole rock) **3.87 ± 0.28 Ma**
15. **79H9** K-Ar
Wild Horse Butte Basalt, same as 79H9-1 (above). *Analytical data:* K = 0.394%; ⁴⁰Ar* = 1.314 × 10⁻¹² moles/g; ⁴⁰Ar* = 7.81%.
(whole rock) **1.92 ± 0.16 Ma**
16. **79H10-7** K-Ar
Guffey Butte Basalt (43°17'30''N, 116°31'W; NW¼NW¼ SE¼SE¼ S36,T1S,R2W; elevation 2800', Walters Butte 7½' quad, Owyhee Co., ID). Ophitic-intergranular, titanogaugite and plagioclase, oxide-rich mesostasis; deeply altered (iddingsite alteration) of olivine, glomeroporphyritic clumps of olivine. *Analytical data:* K = 0.606%; ⁴⁰Ar* = 1.094 × 10⁻¹² moles/g; ⁴⁰Ar* = 6.67%.
(whole rock) **1.04 ± 0.07 Ma**
17. **79H10-1** K-Ar
Guffey Butte Basalt, same as 79H10-7 (above). *Analytical data:* K = 0.585%; ⁴⁰Ar* = 1.111 × 10⁻¹² moles/g; ⁴⁰Ar* = 7.55%.
(whole rock) **1.09 ± 0.06 Ma**
18. **79H17** K-Ar
Otter Basalt (43°13'15''N, 116°23'W; SE¼SE¼ SE¼NW¼ S30,T2S,R1E; elevation 2350', Sinker Butte 7½' quad, Owyhee Co., ID). Intergranular, diktitaxitic, plagioclase and olivine phenocrysts in an interstitial fine-grained titanogaugite, plagioclase, olivine, and oxide-rich mesostasis. *Analytical data:* K = 0.610%; ⁴⁰Ar* = 1.438 × 10⁻¹² moles/g; ⁴⁰Ar* = 8.46%.
(whole rock) **1.36 ± 0.09 Ma**
19. **79H17-2** K-Ar
Otter Basalt, same as 79H17 (above). *Analytical data:* K = 0.581; ⁴⁰Ar* = 35.54 × 10⁻¹² moles/g; ⁴⁰Ar* = 4.03%. *Comment:* Age is discordant, too old due to excess argon.
(whole rock) **34.92 ± 4.31 Ma**
20. **79H18** K-Ar
Sinker Butte dike (43°13'30''N, 116°23'W; SE¼SE¼ SE¼SW¼ S19,T2S,R1E; elevation 2875', Sinker Butte 7½' quad, Owyhee Co., ID). Fine-grained porphyritic basalt, glomeroporphyritic clumps of plagioclase (up to 1.8 mm long) and olivine. Interstitial plagioclase, titanogaugite, olivine, and oxide and glass-rich mesostasis. *Analytical data:* K = 0.5230%; ⁴⁰Ar* = 0.5565 × 10⁻¹² moles/g; ⁴⁰Ar* = 2.34%.
(whole rock) **0.61 ± 0.12 Ma**
21. **79H19** K-Ar
Sinker Butte Basalt, same as 79H18 (above). *Analytical data:* K = 0.490%; ⁴⁰Ar* = 1.162 × 10⁻¹² moles/g; ⁴⁰Ar* = 5.72%.
(whole rock) **1.37 ± 0.11 Ma**
22. **79H20-4** K-Ar
Emmigrant Basalt, same as 79H8-5. (43°14'N, 116°23'W, SW¼NW¼ SW¼NE¼ S19,T2S,R1E; elevation 2975', Sinker Butte 7½' quad, Owyhee Co., ID.) *Analytical data:* K = 0.569%; ⁴⁰Ar* = 0.8766 × 10⁻¹² moles/g; ⁴⁰Ar* = 3.61%.
(whole rock) **0.88 ± 0.11 Ma**
23. **80H1** K-Ar
Basalt from Black Butte (43°05'45''N, 116°11'W; NE¼NE¼ NE¼SW¼ S11,T4S,R2E; elevation 2600', Jackass Butte 7½' quad, Ada Co., ID). Fine to medium-grained subophitic titanogaugite and plagioclase. Olivine crystals and interstitial mesostasis are commonly

- altered to serpentine. *Analytical data*: K = 0.398%; $^{40}\text{Ar}^*$ = 1.511×10^{-12} moles/g; $^{40}\text{Ar}^*$ = 5.55%.
(whole rock) **2.18 ± 0.18 Ma**
24. **80H4** K-Ar
Basalt from Black Butte (43°05'45''N, 116°11'W; SW¼SE¼SE¼NW¼ S11,T4S,R2E; elevation 2680'; Jackass Butte 7½' quad, Ada Co., ID). Medium-grained, granular, subophitic plagioclase (52%), titanite (21%), olivine (18%) shows iddingsite alteration, interstitial oxide-rich mesostasis (9%). *Analytical data*: K = 0.26%; $^{40}\text{Ar}^*$ = 0.9353 × 10⁻¹² moles/g; $^{40}\text{Ar}^*$ = 4.09%.
(whole rock) **2.06 ± 0.24 Ma**
25. **80H6** K-Ar
Montini Basalt (43°10'45''N, 116°23'W; NE¼NW¼ SW¼NE¼ S7,T3S,R1E; elevation 2475', Sinker Butte 1/24000, Owyhee Co., ID). Subophitic titanite, plagioclase, olivine, and oxide-rich mesostasis, intense serpentinization. *Analytical data*: K = 0.40%; $^{40}\text{Ar}^*$ = 5.324 × 10⁻¹² moles/g; $^{40}\text{Ar}^*$ = 2.24%. *Comment*: Age is discordant due to excess argon.
(whole rock) **7.61 ± 0.21 Ma**
26. **80H7-1** K-Ar
Basalt capping the Sinker Creek Butte (43°10'45''N, 116°23'W; NE¼NE¼SW¼NW¼ S12,T3S,R1W; elevation 3040', Sinker Butte 7½' quad, Owyhee Co., ID). Fine to medium-grained intersertal, hyalophilic, plagioclase (58%), titanite 20%, olivine (15.6%), glass and oxide-rich mesostasis (6.4%). *Analytical data*: K = 0.432%; $^{40}\text{Ar}^*$ = 0.9412 × 10⁻¹² moles/g; $^{40}\text{Ar}^*$ = 3.78%.
(whole rock) **1.26 ± 0.17 Ma**
27. **80H7** K-Ar
Basalt capping the Sinker Creek Butte, same as 80H7-1 (above). *Analytical data*: K = 0.419%; $^{40}\text{Ar}^*$ = 4.403 × 10⁻¹² moles/g; $^{40}\text{Ar}^*$ = 24.35%. *Comment*: Age is discordant due to excess argon.
(whole rock) **6.05 ± 0.17 Ma**
28. **80H9-1** K-Ar
Fossil Butte Basalt (43°6'30''N, 116°27'W; SE¼NW¼SE¼NW¼ S3,T4S,R1W; elevation 3225', Oreana 7½' quad, Owyhee Co., ID). Ophitic-intergranular, titanite and plagioclase, oxide-rich mesostasis; iddingsite alteration of olivine phenocrysts. *Analytical data*: K = 0.245%; $^{40}\text{Ar}^*$ = 3.012 × 10⁻¹²; $^{40}\text{Ar}^*$ = 4.81%.
(whole rock) **7.07 ± 0.76 Ma**
29. **80H9** K-Ar
Fossil Butte Basalt, same as 80H9-1 (above). *Analytical data*: K = 0.26%; $^{40}\text{Ar}^*$ = 3.290 × 10⁻¹² moles/g; $^{40}\text{Ar}^*$ = 13.35%.
(whole rock) **7.24 ± 0.29 Ma**
30. **80H11** K-Ar
Basalt from Swan Falls area (43°14'30''N, 116°22'W; NW¼SE¼SW¼SW¼ S17,T2S,R1E; elevation 2800', Wild Horse Butte 7½' quad, Ada Co., ID). Fine to medium-grained subophitic titanite, plagioclase, and olivine, interstitial oxide-rich mesostasis. Intense serpentinization. *Analytical data*: K = 0.365%; $^{40}\text{Ar}^*$ = 1.006 × 10⁻¹² moles/g; $^{40}\text{Ar}^*$ = 6.32%.
(whole rock) **1.58 ± 0.13 Ma**
31. **80H12** K-Ar
Basalt from Swan Falls area (43°14'30''N, 116°22'W; NE¼NE¼NW¼NW¼ S20,T2S,R1E; elevation 2910', Wild Horse Butte 7½' quad, Ada Co., ID). Fine-grained, intergranular, plagioclase, titanite, olivine, interstitial oxide-rich mesostasis. Intense serpentinization. *Analytical data*: K = 0.423%; $^{40}\text{Ar}^*$ = 1.966 × 10⁻¹² moles/g; $^{40}\text{Ar}^*$ = 15.73%.
(whole rock) **2.67 ± 0.10 Ma**
32. **80H13** K-Ar
Swan Falls rim-forming lava (43°14'30''N, 116°22'W; NE¼NE¼NW¼NW¼ S20,T2S,R1E; elevation 2990', Wild Horse Butte 7½' quad, Ada Co., ID). Intersertal, hyalophilic, glomeroporphyritic clumps of plagioclase and olivine, interstitial titanite and oxide-rich glassy mesostasis. *Analytical data*: K = 0.618%; $^{40}\text{Ar}^*$ = 7.899 × 10⁻¹²; $^{40}\text{Ar}^*$ = 29.65%. *Comment*: Age is discordant due to excess argon.
(whole rock) **7.34 ± 0.39 Ma**
33. **80H14** K-Ar
Emigrant Basalt (43°13'15''N, 116°22'45''W; SW¼SW¼NE¼SE¼ S30,T2S,R1E; elevation 2800', Sinker Butte 7½' quad, Ada Co., ID). Subophitic, intergranular, titanite (21%), plagioclase (57%), olivine (12%), oxide-rich mesostasis. *Analytical data*: K = 0.556%; $^{40}\text{Ar}^*$ = 1.040 × 10⁻¹² moles/g; $^{40}\text{Ar}^*$ = 3.57%.
(whole rock) **1.08 ± 0.14 Ma**
34. **80H15** K-Ar
Promontary Basalt (43°13'15''N, 116°22'45''W; SW¼SW¼NE¼SE¼ S30,T2S,R1E; elevation 2930', Sinker Butte 7½' quad, Ada Co., ID). Fine to medium-grained subophitic titanite, plagioclase, euhedral olivine phenocrysts, interstitial oxide-rich mesostasis. *Analytical data*: K = 0.793; $^{40}\text{Ar}^*$ = 1.083 × 10⁻¹² moles/g; $^{40}\text{Ar}^*$ = 11.39%.
(whole rock) **0.78 ± 0.04 Ma**
35. **80H16** K-Ar
Swan Falls Reservoir Basalt (43°13'45''N, 116°22'45''W; NE¼NWSE¼ S19,T2S,R1E; elevation 2450', Sinker Butte 7½' quad, Owyhee Co., ID). Ophitic, intergranular, titanite (17%), plagioclase (52%), olivine (16%), oxide-rich mesostasis, some iddingsite alteration. *Analytical data*: K = 0.544%; $^{40}\text{Ar}^*$ = 1.510 × 10⁻¹² moles/g; $^{40}\text{Ar}^*$ = 6.06%.
(whole rock) **1.60 ± 0.23 Ma**
36. **80H17** K-Ar
Swan Falls Reservoir Basalt (43°13'45''N, 116°22'45''W; NW¼SE¼SW¼NE¼ S19,T2S,R1E; elevation 2650', Sinker Butte 7½' quad, Owyhee Co., ID). Subophitic titanite (28%), plagioclase (51%), olivine (12%), oxide-rich mesostasis. *Analytical data*: K = 0.394%; $^{40}\text{Ar}^*$ = 0.9284 × 10⁻¹² moles/g; $^{40}\text{Ar}^*$ = 7.09%.
(whole rock) **1.36 ± 0.11 Ma**
37. **80H18** K-Ar
Swan Falls Reservoir Basalt (43°14'30''N, 116°23'15''W, SW¼NW¼SE¼SW¼ S18,T2S,R1E; elevation 2650', Sinker Butte 7½' quad, Owyhee Co., ID). *Analytical data*: K = 0.444%; $^{40}\text{Ar}^*$ = 3.487 × 10⁻¹² moles/g; $^{40}\text{Ar}^*$ = 21.52%. *Comment*: Age is discordant and does not fit its stratigraphic setting.
(whole rock) **4.52 ± 0.13 Ma**

38. **80H19** K-Ar
 Montini Basalt (43°11'N, 116°23'30''W; SW¼SW¼
 NW¼SW¼ S7,T3S,R1E; elevation 2600', Sinker
 Butte 7½' quad, Owyhee Co., ID). Ophitic, subophitic
 titanomagite (28%), plagioclase (48%), olivine (19%)
 and oxide-rich glass and mesostasis. *Analytical data:*
 K = 0.419%; ⁴⁰Ar* = 1.214 × 10⁻¹² moles/g;
⁴⁰Ar* = 10.48%.
(whole rock) 1.67 ± 0.09 Ma
39. **80H20** K-Ar
 Montini Basalt, same as 80H19, but elevation 2560'.
Analytical data: K = 0.382%; ⁴⁰Ar* = 1.198 ×
 10⁻¹² moles/g; ⁴⁰Ar* = 12.06%.
(whole rock) 1.81 ± 0.11 Ma

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