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K-Ar DATES FOR VOLCANIC ROCKS ASSOCIATED WITH NEOGENE SEDIMENTARY DEPOSITS IN NORTH-CENTRAL AND NORTHEASTERN OREGON

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This paper presents thirteen K-Ar determinations on various ash-fall tuffs and andesite and basalt flows in north-central and northeastern Oregon. The determinations were made for volcanic rocks that either post-date or are coeval with Neogene sedimentary deposits in the Baker, La Grande, Madras, The Dalles and Tygh Valley areas. For some deposits, these dates are the first radiometric dates available, such deposits having been previously dated only paleontologically. The dates were previously listed in an open-file report (Farooqui and others, 1981b). The purpose behind listing them here is to make them available to a wider audience and also to report the analytical data.

The determinations were made as part of a regional mapping effort directed at post-Columbia River Basalt Group sedimentary units in the Oregon portion of the Columbia Plateau by Rockwell Hanford Operations, Richland, Washington for the U.S. Department of Energy. Mapping was done by Shannon and Wilson, Inc. personnel under contract to the Oregon Department of Geology and Mineral Industries. Samples were sent to Rockwell Hanford Operations where John Lillie coordinated their analysis by Krueger Enterprises (Geochron), Cambridge, Massachusetts. Analytical constants used are: $\lambda\beta = 4.72 \times 10^{-10}/\text{yr}$; $\lambda_e = 0.585 \times 10^{-10}/\text{yr}$; and $K^{40}/K = 1.22 \times 10^{-4}/\text{g}$. All determinations were on whole-rock samples except for two on feldspar concentrates. All but one sample were treated with dilute HF and HNO₃ to remove alterations. Uncertainties reported represent one standard deviation.

SAMPLE DESCRIPTIONS

1. **103-WB** K-Ar
Andesite (NW¼ NW¼ NE¼ S16,T2S,R11E, Fivemile Butte 7½' quad., Wasco Co., OR). Analytical data: K = 0.853%, *Ar⁴⁰ = 5.74 x 10⁻⁴ ppm (13.4% ΣAr⁴⁰), 3.98 x 10⁻⁴ ppm (23.5% ΣAr⁴⁰). Comment: Andesite overlying Chenoweth Formation (of Farooqui and others, 1981a). Treated with dilute HF and HNO₃.
(whole rock) 8.0 ± 0.8 m.y.
2. **105-WB** K-Ar
Basalt (SE¼ SE¼ S24,T2N,R14E, Stacker Butte 7½' quad., along Fulton Ridge E of Fairbanks Gap, Wasco Co., OR). Analytical data: K = 0.461%, *Ar⁴⁰ = 2.17 x 10⁻⁴ ppm (6.7% ΣAr⁴⁰), 2.56 x 10⁻⁴ ppm (8.0% ΣAr⁴⁰). Comment: Basalt flow in Chenoweth Formation (of Farooqui and others, 1981a). Treated with dilute HF and HNO₃.
(whole rock) 7.2 ± 0.7 m.y.
3. **109-WB** K-Ar
Andesite (NE¼ S6,T3S,R12E, Friend 7½' quad., Wasco Co., OR). Analytical data: K = 1.423%, *Ar⁴⁰ = 5.12 x 10⁻⁴ ppm (9.1% ΣAr⁴⁰), 5.31 x 10⁻⁴ ppm (6.3% ΣAr⁴⁰). Comment: Andesite overlying Chenoweth Formation (of Farooqui and others, 1981a). Treated with dilute HF and HNO₃.
(whole rock) 5.1 ± 0.5 m.y.
4. **110-WB** K-Ar
Tuff (NE¼ S10,T1N,R12E, Brown Creek 7½' quad., Wasco Co., OR). Analytical data: K = 0.267%, *Ar⁴⁰ = 1.29 x 10⁻⁴ ppm (7.7% ΣAr⁴⁰), 8.9 x 10⁻⁵ ppm (13.9% ΣAr⁴⁰). Comment: Andesite block in Chenoweth Formation (of Farooqui and others, 1981a).
(feldspar concentrate) 5.7 ± 0.6 m.y.
5. **106-WB** K-Ar
Tuff (S¼ NE¼ S9,T4S,R13E, Tygh Valley 7½' quad., Wasco Co., OR). Analytical data: K = 1.321%, Σ*Ar⁴⁰ = 4.19 x 10⁻⁴ ppm (9.1% ΣAr⁴⁰), 5.04 x 10⁻⁴ ppm (16.0% ΣAr⁴⁰). Comment: Tuff in Tygh Valley Formation (of Farooqui and others, 1981a). Treated with dilute HF and HNO₃.
(feldspar concentrate) 4.9 ± 0.5 m.y.
6. **1F** K-Ar
Basalt (SW¼ S11,T12S,R12E, Round Butte Dam 7½' quad., Jefferson Co., OR). Analytical data: K = 0.286%, *Ar⁴⁰ = 1.88 x 10⁻⁴ ppm (4.3% ΣAr⁴⁰), 1.02 x 10⁻⁴ ppm (4.8% ΣAr⁴⁰). Comment: Crooked River intracanyon flow.
(whole rock) 7.1 ± 1.8 m.y.
7. **5F** K-Ar
Basalt (SW¼ SW¼ NW¼ S21,T12S,R12E, Round Butte Dam 7½' quad., Jefferson Co., OR). Analytical data: K = 0.281%, *Ar⁴⁰ = 2.18 x 10⁻⁴ ppm (8.1% ΣAr⁴⁰), 2.14 x 10⁻⁴ ppm (9.4% ΣAr⁴⁰). Comment: Plateau-forming lava flow of the Deschutes Formation. Treated with dilute HF and HNO₃.
(whole rock) 10.7 ± 1.2 m.y.
8. **6F** K-Ar
Basalt (NE¼ NW¼ S21,T12S,R12E, Round Butte Dam 7½' quad., Jefferson Co., OR). Analytical data: K = 0.141%, *Ar⁴⁰ = 1.43 x 10⁻⁴ ppm (12.5% ΣAr⁴⁰), 1.24 x 10⁻⁴ ppm (11.2% ΣAr⁴⁰). Comment: Lava flow interbedded with Deschutes Formation. Treated with dilute HF and HNO₃.
(whole rock) 13.2 ± 1.5 m.y.
9. **7F** K-Ar
Basalt (NE¼ S17,T9S,R12E, Warm Springs 7½' quad., Jefferson Co., OR). Analytical data: K = 0.321%, *Ar⁴⁰ = 1.94 x 10⁻⁴ ppm (6.5% ΣAr⁴⁰), 2.15 x 10⁻⁴ ppm (7.9% ΣAr⁴⁰). Comment: Plateau-forming lava flow of the Deschutes Formation. Treated with dilute HF and HNO₃.
(whole rock) 8.9 ± 1.0 m.y.

10. 504 K-Ar
Ash-flow tuff (SW¼ SW¼ S19,T10S,R42E, Oxman 7½' quad., Baker Co., OR). *Analytical data:* K = 3.94%, *Ar⁴⁰ = 3.011 x 10⁻³ ppm (37.6% ΣAr⁴⁰), 3.76 x 10⁻³ ppm (42.6% ΣAr⁴⁰). *Comment:* Tuff in Alder Creek Valley, SW of Baker, OR. Treated with dilute HF and HNO₃.
(whole rock) 12.0 ± 0.5 m.y.
11. 505 K-Ar
Ash-flow tuff (NE¼ SW¼ S11,T9S,R42E, Keating 7½' quad., Baker, Co., OR). *Analytical data:* K = 4.083%, *Ar⁴⁰ = 4.145 x 10⁻³ ppm (39.4% ΣAr⁴⁰), 4.086 x 10⁻³ ppm (36.6% ΣAr⁴⁰). *Comment:* Tuff overlying, perhaps interbedded with, tuffaceous sedimentary deposits (Tst of Brooks and others, 1976) in Powder River Valley southeast of Keating, OR. Treated with dilute HF and HNO₃.
(whole rock) 14.1 ± 0.6 m.y.
12. 506 K-Ar
Andesite (NE¼ S5,T7S,R42E, Sawtooth Ridge 7½' quad., Baker Co., OR). *Analytical data:* K = 1.31%, *Ar⁴⁰ = 1.18 x 10⁻³ ppm (36.4% ΣAr⁴⁰), 1.285 x 10⁻³ ppm (34.0% ΣAr⁴⁰). *Comment:* Lava flow from Sawtooth Crater vent; flow is stratigraphically above sediment perhaps equivalent to tuffaceous sedimentary deposits (Tst of Brooks and others, 1976) in the Baker, OR area. Treated with dilute HF and HNO₃.
(whole rock) 13.1 ± 0.8 m.y.
13. 507 K-Ar
Andesite (NW¼ S4,T1N,R39E, Elgin 7½' quad., 3 km NW of Elgin, Union Co., OR). *Analytical data:* K = 0.937%, *Ar⁴⁰ = 8.1 x 10⁻⁵ ppm (3.0% ΣAr⁴⁰), 1.86 x 10⁻⁴ ppm (2.9% ΣAr⁴⁰). *Comment:* Lava from Jones Butte vent. Because vent is in the La Grande graben, date is a younger limiting date for development of graben. Treated with dilute HF and HNO₃.
(whole rock) 2.0 ± 0.8 m.y.

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