

## ***New K-Ar dates from the Wild Rogue southwestern Oregon***

F. Gray and E.H. McKee

Isochron/West, Bulletin of Isotopic Geochronology, v. 32, pp. 27-30

Downloaded from: <https://geoinfo.nmt.edu/publications/periodicals/isochronwest/home.cfml?Issue=32>

---

Isochron/West was published at irregular intervals from 1971 to 1996. The journal was patterned after the journal *Radiocarbon* and covered isotopic age-dating (except carbon-14) on rocks and minerals from the Western Hemisphere. Initially, the geographic scope of papers was restricted to the western half of the United States, but was later expanded. The journal was sponsored and staffed by the New Mexico Bureau of Mines (now *Geology*) & Mineral Resources and the Nevada Bureau of Mines & Geology.



**ISOCHRON/WEST**  
*A Bulletin of Isotopic Geochronology*

All back-issue papers are available for free: <https://geoinfo.nmt.edu/publications/periodicals/isochronwest>

*This page is intentionally left blank to maintain order of facing pages.*

## NEW K-Ar DATES FROM THE WILD ROGUE WILDERNESS, SOUTHWESTERN OREGON

FLOYD GRAY  
EDWIN H. McKEE

U.S. Geological Survey, Menlo Park, CA 94025

The Wild Rogue Wilderness is an elongate area, 31 km x 1.3 to 5 km, extending from the town of Agness to Mount Bolivar within parts of Coos, Curry, and Douglas Counties in southwestern Oregon (figs. 1 and 2). This area, which is in the Oregon Coast Range province, lies just west of the Western Jurassic belt of Irwin (1966). Fault slices of dioritic, gabbroic, and intermediate to silicic volcanic rocks are exposed in the Wilderness area. They are limited on the east by a northeast-striking, steeply-dipping fault which brings igneous rocks against the Dothan Formation of Cretaceous and Jurassic age. To the northwest, these rocks are either steeply faulted against sedimentary rocks of the Jurassic Riddle Formation or unconformably overlain by Eocene sediments.

The area was mapped in detail by Floyd Gray and others (written communication, 1981) in 1978-1980 as part of an evaluation of the mineral resource potential of the Wilderness undertaken by the U.S. Geological Survey for the U.S. Forest Service. Four new K-Ar ages on units that are considered important to the geologic evaluation were determined; these supplement the few existing radiometric ages from the region.

Sample preparation and argon and potassium analysis were carried out in the U.S. Geological Survey laboratories at Menlo Park, Calif. Pure mineral concentrates were obtained using magnetic and heavy-liquid separation techniques. Potassium analyses were performed by a lithium metaborate flux fusion-flame photometry method using the lithium as an internal standard (Ingamells, 1970). Argon analyses were by standard isotope-dilution procedures using a 60° sector, 15.2-cm radius, Neir-type mass spectrometer. The precision of the data is the estimated analytical uncertainty at one standard deviation and is based on experience with replicated analyses in the Menlo Park laboratories. The decay constants for  $^{40}\text{K}$  are:  $\lambda_{\epsilon} + \lambda_{\epsilon'} = 0.581 \times 10^{-10}\text{yr}^{-1}$ ;  $\lambda_{\beta} = 4.962 \times 10^{-10}\text{yr}^{-1}$ , and the atomic abundance of  $^{40}\text{K}$  is  $1.167 \times 10^{-4}$  mole/mole.

### DISCUSSION

The volcanic rocks in the Wild Rogue Wilderness near the town of Marial were mapped as the Rogue Formation by Baldwin (1969) and Ramp and others (1977). The name Rogue Formation was originally applied by Wells and Walker (1953) to a succession of metavolcanic rocks found on the eastern side of the Dothan Formation 20 km east of Marial. The Rogue Formation, as defined in the type area in the Galice quadrangle, is intruded by gabbro and diorite. K-Ar ages determined on hornblende and biotite from gabbro and quartz diorite plutons cutting the Rogue Formation in the Galice quadrangle range from 155 m.y. to 145 m.y. (Dick, 1973), and 140 m.y. to 151 m.y. (Hotz, 1969, 1971). Most of the dates indicated clustered around 150 m.y. providing an uppermost age limit to deposition of the Rogue.

Detailed mapping and petrographic study indicate that andesitic to dacitic volcanic flows found in the northwestern part of the Wild Rogue Wilderness differ in lithology from type Rogue Formation which consists

predominantly (greater than 95 percent) of fragmental material, including fine- to coarse-grained tuffs, agglomerates, flow breccias, and minor flows (less than 5 percent). In addition, silicic porphyritic volcanic rocks in the study area do not appear to be intruded by dioritic or gabbroic rocks but are placed against them along several north-northeast-striking steeply dipping fault zones. Locally, for example south of Mt. Bolivar, swarms of andesitic dikes related to the volcanic rocks that intrude gabbro (Floyd Gray and others, written communication, 1981) indicate a younger age for the volcanic pile.

K-Ar dates were determined on two relatively unaltered volcanic rocks from northwest of Marial (samples 79WG215, 79WG134b). These rocks are representative of volcanic rocks (dacite and andesite) exposed northwest of the diorite and gabbro. Sample 79WG221, a diorite, is typical of the intermediate plutonic rocks cropping out along the Rogue River east of Tate Creek. Another diorite, sample 79WG044, is from a fractured, veined area associated with a cluster of small prospects.

The young age of the andesite and dacite ( $122.8 \pm 6$  and  $133.4 \pm 4$  m.y.) compared to the diorite ( $159.5 \pm 3$  m.y.) substantiates field evidence that the dioritic and gabbroic rocks do not intrude the porphyritic volcanic rocks. The interval between Jurassic plutonism and later volcanic eruptions suggests that the volcanic rocks of the Wild Rogue Wilderness Area postdate the Rogue Formation and represent isolated Late Jurassic and (or) Early Cretaceous volcanism.

### SAMPLE DESCRIPTIONS

1. **79WG215** K-Ar  
Hornblende dacite (SW  $\frac{1}{4}$  NW  $\frac{1}{4}$  S29; 42°46'N, 123°54'W; Bone Mountain 15' quadrangle, Curry County, OR). Light-tan porphyritic flow; contains phenocrysts of andesine and hornblende. The groundmass is felsitic and composed of fine-grained quartz and plagioclase. *Analytical data:*  $\text{K}_2\text{O} = 0.150\%$ ;  $^{40}\text{Ar}/\text{rad} = 2.9902 \times 10^{-11}$  mole/g;  $^{40}\text{Ar}/\text{rad}/^{40}\text{Ar}/\text{tot} = 11.7\%$ . *Collected by:* F. Gray, 1979.

(hornblende)  $133.4 \pm 4$  m.y.

2. **79WG134b** K-Ar  
Andesite (center S5 on Mule Mountain; 42°44'N, 123°55'W; Marial 15' quadrangle, Curry County, OR). Light- to medium-gray slightly amygdaloidal rock; phenocrysts almost exclusively clinopyroxene with minor plagioclase; matrix consists of altered glass, tabular feldspar, clinopyroxene and opaque oxide. *Analytical data:*  $\text{K}_2\text{O} = 0.159\%$ ;  $^{40}\text{Ar}/\text{rad} = 3.8177 \times 10^{-11}$  mole/g;  $^{40}\text{Ar}/\text{rad}/^{40}\text{Ar}/\text{tot} = 26.1\%$ . *Collected by:* F. Gray, 1979. *Comment:* Regional geologic considerations suggest that K-Ar age is young (also sample no. 79WG215); however, age has not been verified by other isotope dates.

(pyroxene)  $122.8 \pm 6$  m.y.

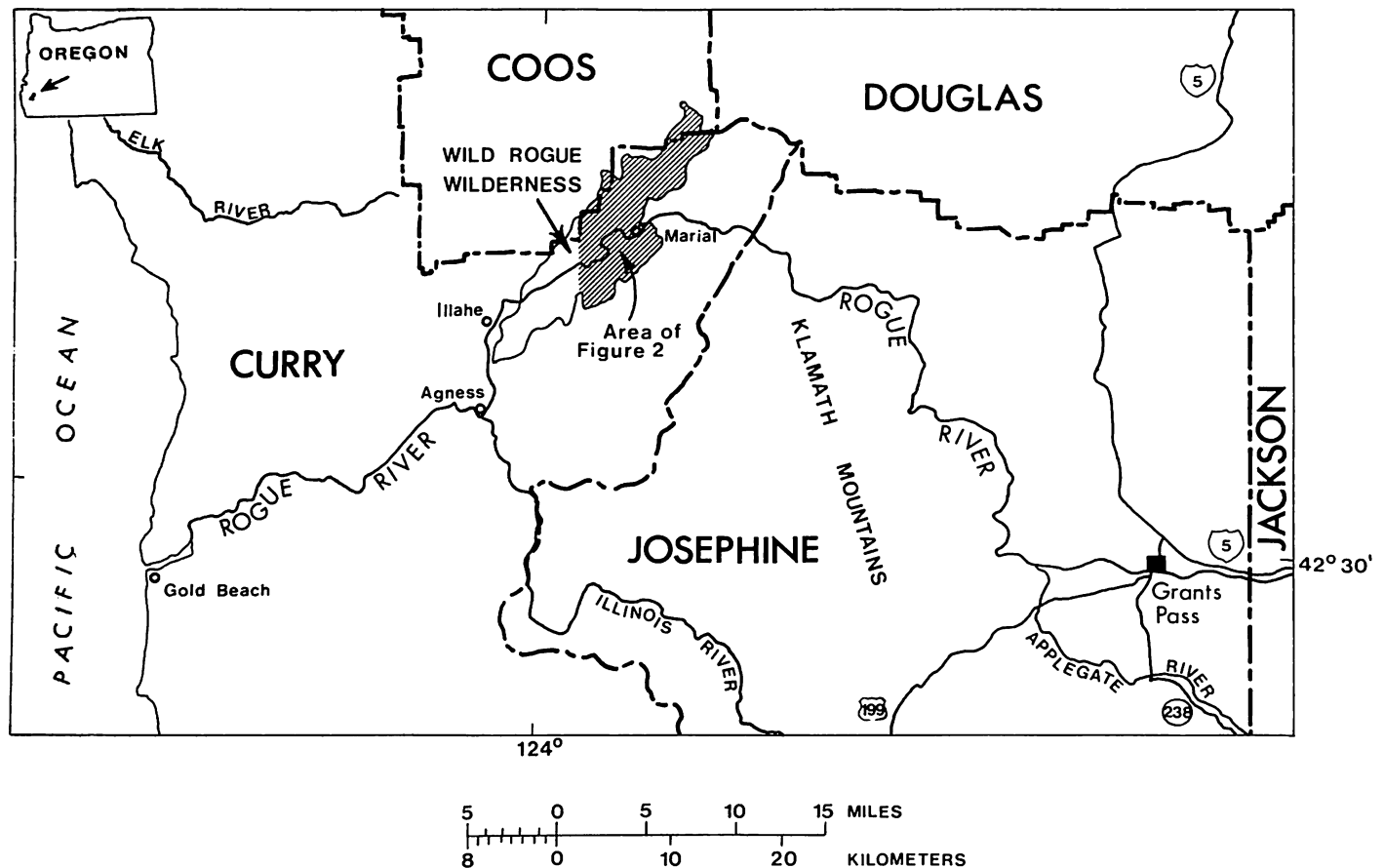


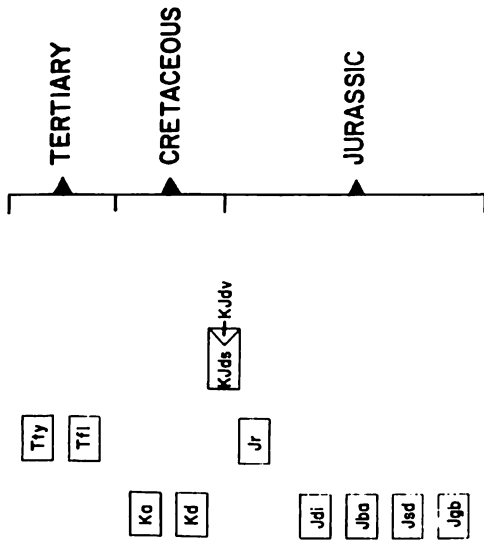
FIGURE 1. Map of southwestern Oregon including the Wild Rogue Wilderness and the area of this report.

3. **79WG221** K-Ar  
Diorite (NE¼ SE¼ S25; 42°42'N, 123°57'W; Marial 15' quadrangle, Curry County, OR). Light-colored medium-grained rock composed of plagioclase feldspar, green hornblende, bluish-green hornblende, and interstitial quartz, minor chlorite, and sericite. *Analytical data:* K<sub>2</sub>O = 0.159 %; <sup>40</sup>Ar<sub>rad</sub> = 3.8177 × 10<sup>-11</sup> mole/g; <sup>40</sup>Ar<sub>rad</sub>/<sup>40</sup>Ar<sub>tot</sub> = 26.1 %. *Collected by:* F. Gray, 1979. *Comment:* Compares well with Middle to Late Jurassic plutonism in the Klamath Mountains as determined from other radiometric dates (Lanphere and others, 1968).  
(hornblende) 159.5 ± 3 m.y.
4. **79WG044** K-Ar  
Tonalite (center E½ S25; 42°43'N, 123°54'W; Marial 15' quadrangle, Curry County, OR). Light-colored medium-grained rock consisting of plagioclase, green to greenish-blue hornblende, secondary chlorite, minor sericite, and interstitial quartz. *Analytical data:* K<sub>2</sub>O = 0.330 %; <sup>40</sup>Ar<sub>rad</sub> = 3.72776 × 10<sup>-11</sup> mole/g; <sup>40</sup>Ar<sub>rad</sub>/<sup>40</sup>Ar<sub>tot</sub> = 27.6 %. *Collected by:* F. Gray, 1979. *Comment:* Collected from faulted veined area. Apparent resetting may correlate with hydrothermal activity and mineralization.  
(hornblende) 76.8 ± 1.5 m.y.

## REFERENCES

- Baldwin, E. M. (1969) Thrust faulting along the lower Rogue River, Klamath Mountains, Oregon: *Geol. Soc. America*, v. 80, no. 10, p. 2047-2052.
- Dick, H. J. B. (1973) K-Ar dating of intrusive rocks in the Josephine Peridotite and Rogue Formation west of Cave Junction, southwestern Oregon: *Geol. Soc. America Abs. with Programs, Cordilleran Sec.*, v. 5, p. 33-34.
- Hotz, P. E. (1969) Relationship between the Dothan and Rogue Formation, southwestern Oregon, in *Geological Survey research 1969, Chapter D: U.S. Geol. Survey Prof. Paper 650-D*, p. D131-D137.
- \_\_\_\_\_. (1971) Plutonic rocks of the Klamath Mountains, California and Oregon: *U.S. Geol. Survey Prof. Paper 684-B*, p. B1-B19.
- Ingamells, C. O. (1970) Lithium metaborate flux in silicate analysis: *Anal. Chim. Acta*, v. 52, p. 323-334.
- Irwin, W. P. (1966) Geology of the Klamath Mountains: *Calif. Div. Mines and Geology Bull.* 190, p. 19-38.
- Lanphere, M. A., Irwin, W. P., and Hotz, P. E. (1968) Isotopic age of the Nevada orogeny and older plutonic metamorphic events in the Klamath Mountains, California: *Geol. Soc. America Bull.*, v. 79, p. 1027-1052.
- Ramp, Len, Schlicker, H. G., and Gray, J. J. (1977) Geology, mineral resources, and rock material of Curry County, Oregon: *Oregon Dept. Geol. Mineral Ind. Bull.* 93.
- Wells, F. G., and Walker, George (1953) Geology of the Galice quadrangle, Oregon: *U.S. Geol. Survey Geol. Quad. Map GQ-25*.

CORRELATION OF MAP UNITS



DICTIONARY OF MAP UNITS

- Tty Tyee Formation
- Tfi Flourney Formation of Baldwin (1974)
- Ka Andesite (122.8±6m.y.)
- Kd Dacite (133.4±4m.y.)
- Jr Dothan Formation
- Jdi Sedimentary rocks
- Jba Volcanic rocks
- Jsd Riddle Formation
- Jgb Diorite
- KJds Metabasalt
- KJdv Sheeted Dikes
- Jdb Gabbro

- Contact
- Fault - Dashed where approximately located, dashed where concealed
- Thrust fault - Sawteeth on upper plate
- Shear zone
- Wilderness boundary
- 79WG215
- 133.414

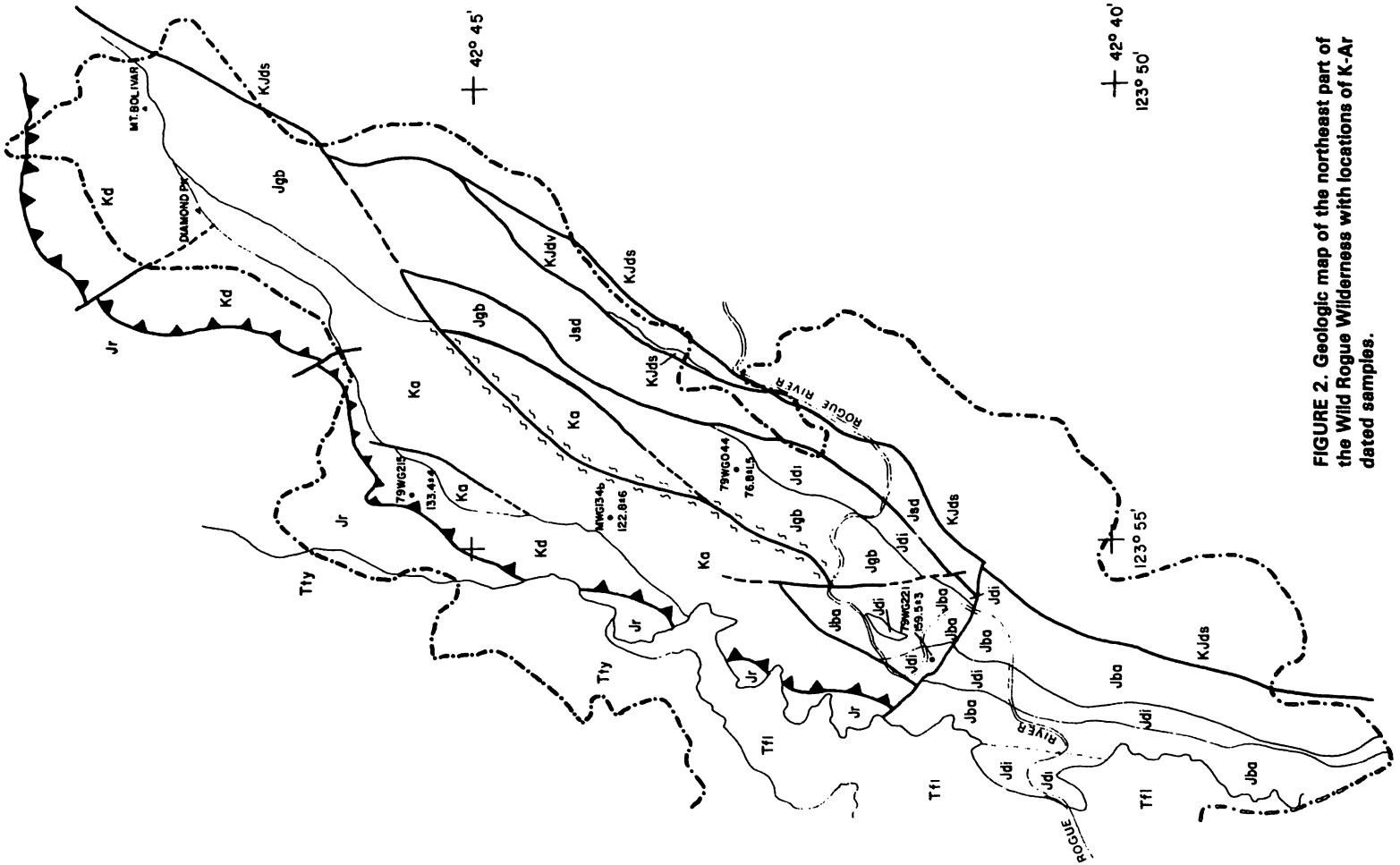


FIGURE 2. Geologic map of the northeast part of the Wild Rogue Wilderness with locations of K-Ar dated samples.

