

Radiometric ages of some Eocene volcanic rocks, southwestern Montana

R.A. Chadwick

Isochron/West, Bulletin of Isotopic Geochronology, v. 27, pp. 11

Downloaded from: <https://geoinfo.nmt.edu/publications/periodicals/isochronwest/home.cfml?Issue=27>

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.

RADIOMETRIC AGES OF SOME EOCENE VOLCANIC ROCKS, SOUTHWESTERN MONTANA

ROBERT A. CHADWICK

Department of Earth Sciences, Montana State University, Bozeman, MT 59717

This paper lists radiometric information on four volcanic rocks collected in Beaverhead, Madison, and Meagher Counties, Montana. Ages are determined as Eocene by the K-Ar method. Funding was provided by the U.S. Geological Survey under grant no. 14-08-0001-G-334.

Rhyolite from Red Mountain, near Norris, Montana, yields a 52.7 m.y. date and may mark the start of volcanism along the Absaroka–Gallatin zone of eruptive centers. These centers extend southeastward from the Norris area along the North Meadow Creek–Spanish Peaks fault and the parallel Cherry Creek–Squaw Creek fault into the Gallatin Range and Absaroka Mountains (Chadwick, 1970). Age of igneous activity decreases southeastward. Rhyolite and rhyodacite plugs and breccias of the Norris area have been described by Kavanagh (1965) and Hess (1976).

Rhyolite porphyry from the Castle Mountain igneous complex southeast of White Sulphur Springs yields an age of 47.6 m.y. The rhyolite postdates emplacement of the major granite and diorite stocks (Winters, 1968).

SAMPLE DESCRIPTIONS

1. *NR-1 (Geochron No. B-3908)* K-Ar
Dense white and pink flow-banded rhyolite with sparse biotite phenocrysts ($45^{\circ}37.1'N$, $111^{\circ}35.0'W$; NW $\frac{1}{4}$ SE $\frac{1}{4}$ S34,T2S,R1E; ridge on S side Red Mountain; Norris 15' quad., 10 km NE of Norris, Madison Co., MT). *Analytical data*: K = 5.490%, $^{40}Ar = 0.02093$ ppm, $^{40}Ar/\Sigma Ar^{40} = 51\%$. *Collected by*: R. A. Chadwick; *Dated by*: Geochron Laboratories, Inc.
(biotite) 52.7 ± 2.0 m.y.

2. *CM-2 (Geochron No. B-3909)* K-Ar
Gray rhyolite or rhyodacite porphyry with orthoclase, biotite, plagioclase, and quartz phenocrysts ($46^{\circ}28.7'N$, $110^{\circ}38.5'W$; NW $\frac{1}{4}$ NE $\frac{1}{4}$ S7,T8N,R9E; N slope upper Corral Ck. drainage, Castle Town 7 $\frac{1}{2}'$ quad., 10 km NW of Lennep, Castle Mts., Meagher Co., MT). *Analytical data*: (biotite) K = 6.361%, $^{40}Ar = 0.02190$ ppm, $^{40}Ar/\Sigma Ar^{40} = 43\%$; (feldspar concentrate) K = 1.628%, $^{40}Ar = 0.005605$ ppm, $^{40}Ar/\Sigma Ar^{40} = 19\%$. *Collected by*: R. A. Chadwick; *Dated by*: Geochron Laboratories, Inc.
(biotite) 47.6 ± 1.8 m.y.
(feldspar) 47.6 ± 2.1 m.y.

3. *CC-1 (Geochron No. R-3872)* K-Ar
Dense, black pilotaxitic basalt ($45^{\circ}6.2'N$, $112^{\circ}46.2'W$; SE $\frac{1}{4}$ SW $\frac{1}{4}$ S25,T8S,R10W; W bank Beaverhead River, Dalys 7 $\frac{1}{2}'$ quad., Beaverhead Co., MT). *Analytical data*: K = 2.308%, $^{40}Ar = 0.007670$ ppm, $^{40}Ar/\Sigma Ar^{40} =$

65%. *Collected by*: R. A. Chadwick; *Dated by*: Geochron Laboratories, Inc.

(whole rock) 46.0 ± 2.0 m.y.

4. *BM-1* K-Ar
Black olivine basalt of Block Mountain, some vesicles, mostly unfilled ($45^{\circ}26.7'N$, $112^{\circ}31.7'W$; SE $\frac{1}{4}$ NE $\frac{1}{4}$ S36,T4S,R8W; roadcut on N bank Big Hole River; Block Mountain 7 $\frac{1}{2}'$ quad., Beaverhead Co., MT). *Analytical data*: K = 1.735%, $^{40}Ar = 3.13895 \times 10^{-6}$ cc/gm, $^{40}Ar/\Sigma Ar^{40} = 85\%$. *Collected by*: R. A. Chadwick; *Dated by*: R. L. Armstrong, U. British Columbia.
(whole rock) 44.8 ± 1.6 m.y.

REFERENCES

- Chadwick, R. A. (1970) Belts of eruptive centers in the Absaroka–Gallatin volcanic province, Wyoming–Montana: *Geol. Soc. America Bull.*, v. 81, p. 267–273.
- Hess, D. F. (1976) Road log and field guide—a geology of Norris–McAllister area: *Mont. Bur. Mines and Geol. Spec. Publ.* 73, p. 73–90.
- Kavanagh, J. (1965) A study of selected igneous bodies of the Norris–Red Bluff area, Madison County, Montana: M.S. thesis, Mont. State Univ., Bozeman.
- Winters, A. S. (1968) Geology and ore deposits of the Castle Mountain mining district, Meagher County, Montana: *Mont. Bur. Mines and Geol. Bull.* 64.

