K-Ar ages of Cenozoic volcanic rocks: Walker Lake 1x2° quadrangle, eastern California and western Nevada

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K-Ar AGES OF CENOZOIC VOLCANIC ROCKS: WALKER LAKE 1x2° QUADRANGLE, EASTERN CALIFORNIA AND WESTERN NEVADA

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Sixteen new K-Ar age determinations for Tertiary volcanic rocks from widely scattered localities in the Walker Lake 1x2° quadrangle, Nevada and California, are reported. The samples were collected by geologists of the U.S. Geological Survey to provide geochronologic information as an aid to mapping and for resource source-assessment studies (Stewart and others, 1982). The rocks dated include andesites, dacites, and rhyolites. The dates are considered to represent the cooling ages of the unit; one sample of alunite from altered rhyolite gives an age of alteration. From west to east, there are seven samples from the Sierra Nevada, one from the Pine Nut Mountains, three from the Wellington Hills, one from the Bodie Hills (Masonic district), three from the Wassuk Range, and one from Miller Mountain (fig. 1).

Pure mineral separates from 14 rock specimens were prepared using techniques described by Silberman and McKee (1971), and two samples of andesite were crushed, sieved, and treated in acid (McKee and Klock, 1979); these were used for argon and potassium analyses. Potassium was analyzed by flame photometry using a lithium metaborate fusion technique, with the lithium serving as an internal standard (Ingamells, 1970). Argon analysis was done by standard isotope dilution mass spectrometry techniques using procedures described by Dalrymple and Lanphere (1969). The constants used in the age calculations are those recommended by Steiger and Jager (1977): $\lambda_\epsilon + \lambda_\epsilon' = 0.581 \times 10^{-10}yr^{-1}$, $\lambda_\beta = 4.962 \times 10^{-10}yr^{-1}$, and $^{40}K/K$ total $= 1.167 \times 10^{-4}$. Precision (±) is at σ.

SAMPLE DESCRIPTIONS

1. *79–RA–100* K-Ar
Rhyolite tuff, basal unit in a section of volcanic and sedimentary rocks (38°45'10''N,119°58'30''W; about 1 km SW of Scotts Lake; Freel Peak 7½' quad, CA). *Analytical data:* K_2O = 7.37%, $^{40}Ar^*$ = 2.7635×10^{-10} mole/g, $^{40}Ar^*/^{40}Ar$ = 49.1%. *Collected by:* Richard A. Armin.
(biotite)25.9 ± 0.8 m.y.

2. *79–RA–43* K-Ar
Hornblende andesite intrusion, top of Stevens Peak (38°43'57''N,119°59'00''W; Markleeville 15' quad, CA). *Analytical data:* K_2O = 0.62%, $^{40}Ar^*$ = 4.6670×10^{-12}, $^{40}Ar/^{40}Ar$ = 3.5%. *Collected by:* Richard A. Armin.
(hornblende)5.2 ± 0.8 m.y.

3. *79–RA–46* K-Ar
Rhyolite lava flow or welded tuff (38°33'49''N, 119°46'47''W; Markleeville 15' quad, CA). The Noble Canyon Rhyolite of Dalrymple (1964). *Analytical data:* K_2O = 8.67%, $^{40}Ar^*$ = 5.81437×10^{-11} mole/g, $^{40}Ar^*/^{40}Ar$ = 76.5%. *Collected by:* Richard A. Armin.
(biotite)4.7 ± 0.2 m.y.

4. *80–P–26* K-Ar
Porphyritic dacite intrusion (38°29'55''N, 119°48'30''W; from the N side of Highland Lake; Dardanelles Cone 15' quad, CA). Intensely sericitized. *Analytical data:* K_2O = 9.19%, $^{40}Ar^*$ = 8.4128×10^{-12} mole/g, $^{40}Ar/^{40}Ar$ = 6.44%. *Collected by:* William J. Keith (Paul Ostendorf).
(alkali feldspar)6.3 ± 0.5 m.y.

5. *75–K–54* K-Ar
Porphyritic dacite intrusive (38°32'46''N, 119°45'16''W; from Highland Peak; Markleeville 15' quad, CA). Phenocrysts of quartz, biotite, hornblende and sanidine in an aphanitic groundmass. *Analytical data:* K_2O = 8.51%, $^{40}Ar^*$ = 4.9463×10^{-11} mole/g, $^{40}Ar^*/^{40}Ar$ = 33.3%. *Collected by:* William J. Keith.
(biotite)4.0 ± 0.2 m.y.

6. *80–DJ–66* K-Ar
Porphyritic biotite hornblende dacite lava (38°47'54''N, 119°38'36''W; from Double Spring Flat NW of Topaz Lake, NV). Overlies silicified, argillized, bleached andesite. *Analytical data:* K_2O = 7.59%, $^{40}Ar^*$ = 1.2192×10^{-10} mole/g, $^{40}Ar^*/^{40}Ar$ = 26.8%. *Collected by:* David A. John.
(biotite)10.6 ± 0.4 m.y.

7. *LPA* K-Ar
Andesite of Leviathan Peak (38°40'07''N, 119°36'40''W; from N of Highway 89 at Monitor Pass, CA). Hornblende-bearing andesite flow. Youngest unit in this part of the Monitor Range. Post-dates mineralization and alteration at the Leviathan Mine. *Analytical data:* K_2O = 0.778%, $^{40}Ar^*$ = 6.5325×10^{-12} mole/g, $^{40}Ar^*/^{40}Ar$ = 21.0%. *Collected by:* David A. John.
(hornblende)5.8 ± 0.5 m.y.

8. *1–94–9J* K-Ar
Hornblende, biotite vitric ash bed (38°58'00''N, 119°30'45''W; from about 1 mi NW of Smith Ranch, NV). In sequence of diatomite and fine-grained tuff. *Analytical data:* K_2O = 7.66%, $^{40}Ar^*$ = 1.0443×10^{-11} mole/g, $^{40}Ar^*/^{40}Ar$ = 10.8%. *Collected by:* John H. Stewart.
(hornblende)9.4 ± 0.8 m.y.

9. *4–23–10J* K-Ar
Biotite-hornblende vitric rhyodacite breccia (38°43'57''N,119°22'00''W; from a flow-dome complex that intrudes a sequence of sedimentary and andesitic rocks along Hope Canyon, NV). *Analytical data:* K_2O = 8.24%, $^{40}Ar^*$ = 9.2547×10^{-11} mole/g, $^*Ar^{40}/Ar^{40}$ = 37.9%. *Collected by:* John H. Stewart.
(biotite)7.8 ± 0.3 m.y.

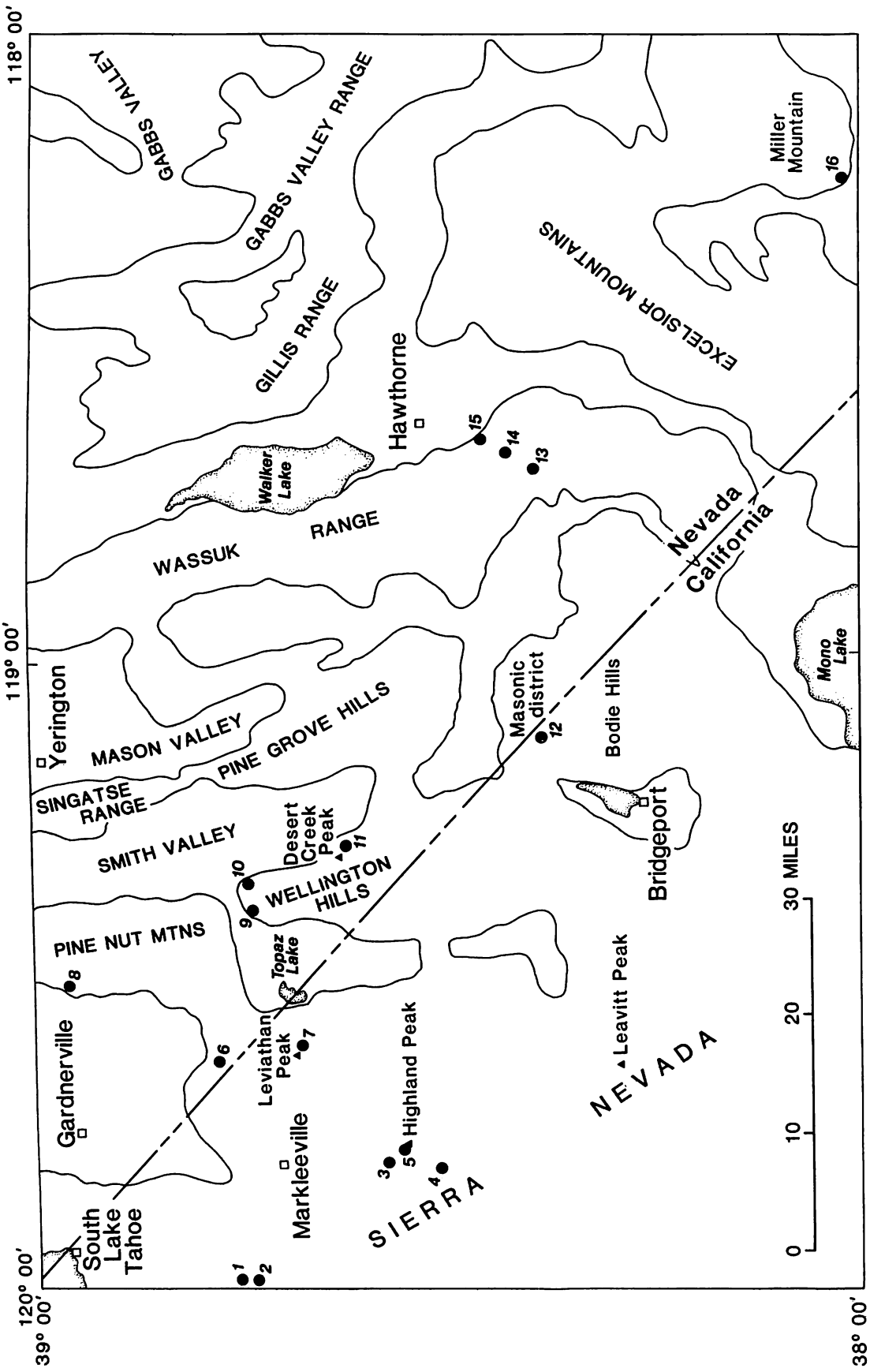

FIGURE 1. Walker Lake 1x2° quadrangle, California-Nevada, showing localities of new K-Ar dates of Cenozoic volcanic rocks. Numbers on figure correspond to sample descriptions.

10. *4–23–9J* K-Ar
Hornblende-biotite andesite (38°43'57''N, 119°21'56''W; from a lava flow, low in a thick sequence of flows and flow breccias about 1.5 mi SE of Wellington, NV). *Analytical data:* K_2O = 0.634%, $^{40}Ar^*$ = 1.1691 x 10^{-11} mole/g, $^{40}Ar/^{40}Ar$ = 9.8%. *Collected by:* John H. Stewart.
(hornblende)18.4 ± 1.8 m.y.

11. *4–7–35J* K-Ar
Hornblende-biotite andesite (38°36'45''N, 119°18'52''W; from a thick sequence of andesite lava flows and flow breccias that form Desert Creek Peak, NV). *Analytical data:* K_2O = 8.31%, $^{40}Ar^*$ = 1.2088 x 10^{-10} mole/g, $^{40}Ar^*/^{40}Ar$ = 40.0%. *Collected by:* John H. Stewart.
(biotite)10.1 ± 0.4 m.y.

12. *61581–4* K-Ar
Alunite vein cutting silicified granitic rock (38°21'22"N, 119°07'34''W; from the Pittsburg-Liberty Mine at Old Town in the Masonic district, CA). *Analytical data:* K_2O = 7.78%, $^{40}Ar^*$ = 1.4358 x 10^{-10} mole/g, $^{40}Ar^*/^{40}Ar$ = 64.9%. *Collected by:* Frank J. Kleinhampl.
(alunite)12.8 ± 0.4 m.y.

13. *210–2* K-Ar
Andesite lava flow (38°22'42''N,118°41'08''W; Wassuk Range, NV). *Analytical data:* K_2O = 3.26%, $^{40}Ar^*$ = 7.0763 x 10^{-11} mole/g, $^{40}Ar^*/^{40}Ar$ = 15.0 ± 0.4%. *Collected by:* Dann C. Johannesen.
(whole rock)15.0 ± 0.5 m.y.

14. *149–6* K-Ar
Andesite lava flow (38°24'22''N,118°39'55''W; Wassuk Range, NV). *Analytical data:* K_2O = 3.48%, $^{40}Ar^*$ = 7.873 x 10^{-11}, $^{40}Ar^*/^{40}Ar$ = 48.6%. *Collected by:* Dann C. Johannesen.
(whole rock)15.7 ± 0.5 m.y.

15. *145–14* K-Ar
Andesite lava flow (38°26'35''N,118°39'00''W; Wassuk Range, NV). *Analytical data:* K_2O = 2.365%, $^{40}Ar^*$ = 5.4129 x 10^{-11} mole/g, $^{40}Ar^*/^{40}Ar$ = 44.3%. *Collected by:* Dann C. Johannesen.
(whole rock)15.8 ± 0.5 m.y.

16. *1–115–30J* K-Ar
Biotite-bearing rhyolite welded tuff (38°01'00''N, 118°14'17''W; Miller Mountain, NV). In a sequence of conglomeratic sedimentary rocks. *Analytical data:* K_2O = 8.28%, $^{40}Ar^*$ = 1.4393 x 10^{-10} mole/g, $^{40}Ar^*/^{40}Ar$ = 35.3%. *Collected by:* John H. Stewart.
(biotite)12.0 ± 0.6 m.y.

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