A K-Ar date on the rocky mountain pediment sequence, north-central New Mexico

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SHORT NOTES

A K-AR DATE ON THE ROCKY MOUNTAIN PEDIMENT SEQUENCE, NORTH-CENTRAL NEW MEXICO

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For almost a century, the flights of broad erosion surfaces arranged in step-like fashion at the foot of the mountains of west-central United States have piqued the minds of many geologists. Not only are there still some differences of opinion regarding the origin of these pediments, but the estimates of their age range over several million years.

The age determination described in this note makes it possible to establish a minimum age of 4.3 m.y. for the oldest pediment surface on the Philmont Scout Ranch, north-central New Mexico. The basalt flow that was dated covers the highest pediment (Uracca surface) in this area, thus is younger than the surface. However the paleosol under the basalt, and the relatively large vertical distance between the Uracca surface and the next younger surface, both indicate a greater difference in age between these two oldest surfaces than between any two successively younger surfaces, suggesting that development of the younger pediments could have taken place in Pleistocene time (assuming the Plio-Pleistocene boundary to be 2.5 to 3.0 million years old).

The age determination and petrography are by the Field Research Laboratory of Mobil Research and Development Corporation, Dallas, Texas, and sponsored by the New Mexico Bureau of Mines and Mineral Resources. The constants used in calculating the age are: $\lambda_e = 5.85 \times 10^{-11}/\text{yr}$; $\lambda_\beta = 4.72 \times 10^{-10}/\text{yr}$; $K^{40}/K_{total} = 1.22 \times 10^{-4}$ g/g.

M-FRL1388 K-Ar (whole rock) 4.3±0.1 m.y.

Uracca Mesa basalt flow (36°24′15″N, 104°59′18″W; Uracca Mesa, Philmont Scout Ranch, Union Co., NM) covering the Uracca surface, the highest pediment surface in this area. Phenocrysts of plagioclase and lesser olivine and biotite in a ground mass of plagioclase, pyroxene, olivine-iddingsite, and iron oxides; shows virtually no alteration except iddingsite after olivine. Analytical data: K = 1.536%; $\overset{*}{Ar}^{40}$ = 1.175 and 1.174 x 10^{-11} moles/gm; $\overset{*}{Ar}^{40}/\Sigma Ar^{40}$ = 56, 48%. Collected by: K. M. Hussey, Iowa State Univ.