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K-Ar AGES OF IGNEOUS ROCKS OF THE MITU GROUP, HUANCAYO REGION, CENTRAL PERU

by
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and
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Abstract:

Six K-Ar age determinations obtained from intrusive igneous rocks intercalated in the Mitu Group of the Huancayo region, Central Peruvian Andes, indicated that these rocks have a minimum age of 260 m.y. (upper Lower Permian).

From this data and from stratigraphical evidence the age of the Mitu red beds is considered to be Artinskian (Leonardian).

Introduction:

Dunbar and Newell (1949) and Newell et al. (1953) established a general Permian (late Leonardian or post-Leonardian) age for the Mitu Group red beds (McLaughlin, 1924), based mainly on its stratigraphical position, overlying unconformably Copacabana Group limestones, that in central Peru carry an early Leonardian fusuline fauna.

The Mitu Group is extensively developed in northern, central and southern Peru and includes red arkosic sandstones, shales, coarse clastics and volcanics, reaching more than 4,000 m in thickness in the Cuzco region (southern Peru) Newell et al. (1953).

Upper Triassic (Norian) and Jurassic marine limestones overlie the Mitu Group concordantly and some authors as Mégarid (1968) and Benavides (1968) indicated that the red beds deposition could have been continued until the Triassic.

K-Ar age determinations performed on igneous rocks of the Huancayo region that intrude and are intercalated in the Mitu Group sediments indicated that the red bed sequence is probably older than 260 m.y. and should belong to the Artinskian (upper Lower Permian).

Stratigraphy:

Details on the stratigraphy of the Huancayo area are presented by M é g a r d (1968). In the area mapped by M é g a r d the Mitu is constituted by red brick and violet conglomerates, sandstones, shales, intercalated with acid and intermediate lavas and reaches a thickness of 2,500 m.

The group rests unconformably on strongly folded metasediments of the Excelsior Group (Devonian?), being conformably recovered by upper Triassic marine sediments of the Pucará Group. (Fig. 1).

M é g a r d (1968) describes the igneous rocks associated to the Mitu Group in the Huancayo quadrangle as dacites-tonalites, microgranites and microgranodiorites stocks, that pass laterally to rhyolitic or dacitic sills and lava flows intercalated in the clastic rocks. He points out that the sills and lava flows are difficult to distinguish from each other and both are probably genetically related to the stocks (M é g a r d , 1968).

Toward the northeastern corner of the Huancayo quadrangle the upper Paleozoic rocks, including the Mitu, were affected by regional metamorphism that was assigned by M é g a r d (1968) to the Andean orogenic movements.

From the geotectonic point of view the Mitu Group has been interpreted as the "molasse" facies that followed the Neohercian diastrophism (M é g a r d , 1968) and everywhere in Peru the group is associated with acid and intermediate igneous activity.

Results obtained:

Samples H-1, H-2 and H-3 were collected from bodies concordantly intercalated in the Mitu Group outcropping along the secondary road to the Granja Comunal de Pucará, about 18 km southeast from Huancayo (Fig. 1).

Sample H-4 was taken from a small dyke cutting the Mitu and Samples H-5 and H-6 from the stock of Cerro Belepúquen, at Hacienda Chorrillos, approximately 4,5 Km to the northeast of Huancayo (Fig. 1).

The rocks present an andesitic composition; from the textural point of view they can be classified as diorite porphyries.

The K-Ar analysis were processed according to the technique described by A m a r a l et al. (1966) and the data are presented on Table 1.

Sample H-6 yielded a K-Ar age of 260 m.y., and this determination is taken as the minimum age for the intrusive rocks.

The younger ages obtained (samples H-2, H-3, H-4 and H-5) can probably represent argon loss resulting from a later thermal event (Lower-Middle Jurassic or Late Cretaceous) that affect the upper Paleozoic and younger rocks of the area (M é g a r d , 1968). A similar explanation could perhaps be applied for the still younger age (Middle Cretaceous) obtained for sample H-1. However, presently the information at hand is insufficient for any definite interpretation.

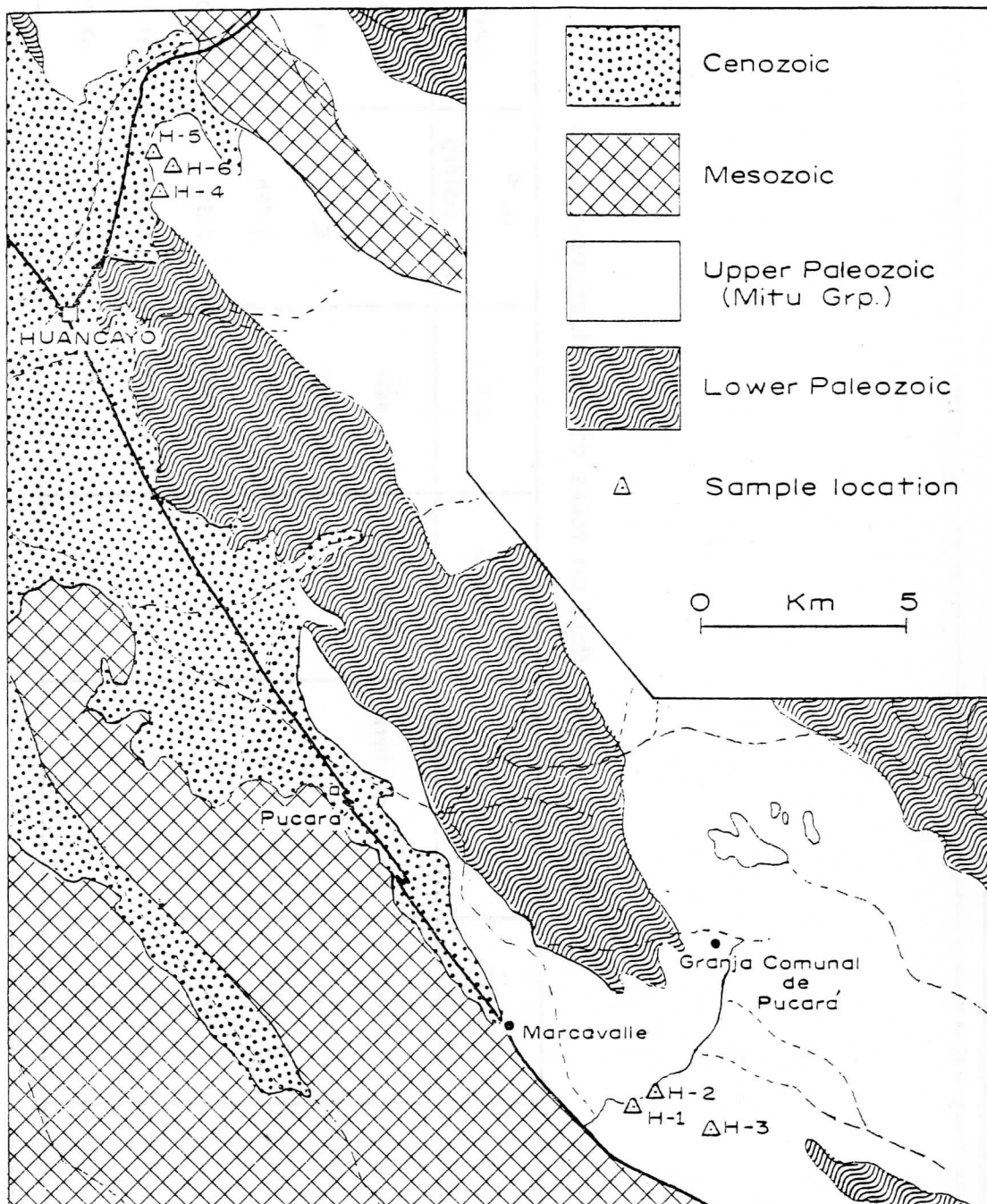


Fig. 1 — Location of samples studied.

TABLE I — K-Ar data on rocks of the Huancayo region

Lab. n.º	Field n.º	Rock	Material	%K	^{40}Ar ccSTP/g	%Ar ⁴⁰ air	Age m.y.
SPK — 1768	H-1	Diorite porphyry	Whole rock	1.6499	7.599	42.17	112 ± 7
SPK — 1751	H-2	"	"	0.7920	5.152	60.62	156 ± 6
SPK — 1764	H-3	"	"	0.2678	1.926	73.60	172 ± 16
SPK — 1757	H-4	"	"	1.2790	8.345	28.03	157 ± 9
SPK — 1752	H-5	"	"	0.9549	6.354	31.91	160 ± 10
SPK — 1763	H-6	"	"	0.5546	6.183	63.36	260 ± 25

Three preliminary conclusions can be drawn from the data presented above: a) the minimum age for Mitu Group is 260 m.y., and this indicates an Artinskian (upper Lower Permian) age for the red beds, this interpretation being in accordance with the stratigraphic data available (Dunbar and Newell, 1949; Newell et al., 1953); b) the isotope ages obtained indicate the existence of a Lower-Middle Jurassic tectonic event in the area. However, there is presently no stratigraphic evidence for this assumption; c) although apparently concordant, an hiatus involving the interval between the Upper Permian to the Upper Triassic probably separates the Mitu Group from lowermost Mesozoic rocks of the area.

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INFORMATION ON THE SAMPLES

- Sample H-1 Diorite porphyry with plagioclase phenocrysts. Sill intruding the Mitu Group at road to Granja Comunal de Pucará. Lat. 12°14'S, Long. 75°5' WG.
- Sample H-2 Idem. Lat. 12°13'S, Long. 75°5' WG.
- Sample H-3 Idem. Lat. 12°14' S, Long. 75°4' WG.
- Sample H-4 Idem. Dyke intruding the Mitu Group at Hacienda Chorrillos. Lat. 12°2' S, Long. 75°10' WG.
- Sample H-5 Idem. Stock intruding the Mitu Group at Hacienda Chorrillos. Lat. 12°2' S, 75°11' WG.
- Sample H-6 Idem. Lat. 12°2' S, Long. 75°10' WG.

REFERENCES

- AMARAL, G., CORDANI, U.G., KAWASHITA, K. and REYNOLDS, J.H. — 1966 — Potassium — argon dates of basaltic rocks from southern Brazil. *Geoch. Cosmoch. Acta*, v. 30, pp. 159-189.
- BENAVIDES-CÁCERES, V. — 1968 — Saline deposits of South America. In R. B. Mattox (Ed.), *Saline Deposits*, pp. 250-290, *Geol. Soc. Amer. Spec. Paper.* 88.
- MÉGARD, F. — 1968 — *Geología del Cuadrángulo de Huancayo*, Serv. de Geol. Miner., Bol. n. 18, Lima.
- MC LAUGHLIN, D.H. — 1924 — The geology and physiography of the Peruvian Cordillera, Departments of Junín and Lima. *Geol. Soc. Amer. Bull.*, v. 35, pp. 591-632.
- DUNBAR, C.O. and NEWELL, N.D. — 1949 — Marine early Permian of the Central Andes and its fusuline faunas. *Amer. Jour. Sci.*, v. 224, pp. 377-402 and 457-491.
- NEWELL, N.D., CHRONIC, J. and ROBERTS, T.S. — 1953 — Upper Paleozoic of Peru. *Geol. Soc. Amer. Mem.* 58.