COMMUNICATION

FURTHER PALEOMAGNETIC EVIDENCE FOR A POSSIBLE TECTONIC ROTATION OF MEXICO

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RESUMEN

Existe un déficit de datos paleomagnéticos sobre rocas de México (Pal y Urrutia, 1977). En un estudio paleomagnético sobre rocas terciarias de Jalisco (Urrutia y Pal, 1977) se ha planteado la posibilidad de una rotación tectónica de México con respecto a Norte América 'estable'. En la presente comunicación se reportan más posiciones polares calculadas a partir de datos de Nairn *et al.* (1975), en apoyo de dicha hipótesis de rotación tectónica.

ABSTRACT

Only a few paleomagnetic data are available on Mexican rocks (Pal and Urrutia, 1977). Urrutia, and Pal (1977) based on a study of Tertiary rocks from Jalisco have pointed out the possibility of tectonic rotation of Mexico with respect to 'stable' North America. This 'note' reports further pole positions for Mexico computed from data of Nairn *et al.* (1975) which support the hypothesis of tectonic rotation.

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INTRODUCTION

Paleomagnetic data available on Mexican rocks have been summarized earlier Pal and Urrutia (1977). A new paleomagnetic study on Tertiary rocks from Jalisco has been reported by Pal and Urrutia (1976) and Urrutia and Pal (1977), where the possibility of a tectonic rotation of Mexico with respect to 'stable' North America has been pointed out.

The purpose of the present 'note' is to report further pole positions calculated from the directions of stable remanent magnetization and K-Ar age data given by Nairn *et al.* (1975).

DISCUSSION

Results are summarized in Table 1. Only sites with known radiometric age have been used for this calculation. Upper Oligocene pole position (28.5-31.5 m.y.) is concordant with other Oligocene poles from Mexico (No. of individual poles 4; mean pole (m_o) 70°N, 169°E; K 95; α_{95} 9°). This mean pole position is plotted in Fig. 1(a) and compared with the mean Oligocene pole position for U. S. A. (No. of individual poles 4; mean pole (na_o) 85°N, 109°E; K 34; α_{95} 16°). It can be seen that these poles are significantly different at ~ 88% as shown by F-test though there is some overlap at 95% confidence level. Comparison of Miocene poles from Mexico and North America too results quite interesting as can be seen from Fig. 1 (b) where Mexican mean pole for this age (No. of individual poles 3; mean pole (m_m) 76°N, 165°E; K 96; α_{95} 13°) is compared with the North American mean (No. of individual poles 7; mean pole (na_m) 88°N, 208°E; K 81; α_{95} 7°). N. A. Poles for comparison are the class "A" poles taken from Hicken *et al.* (1972).

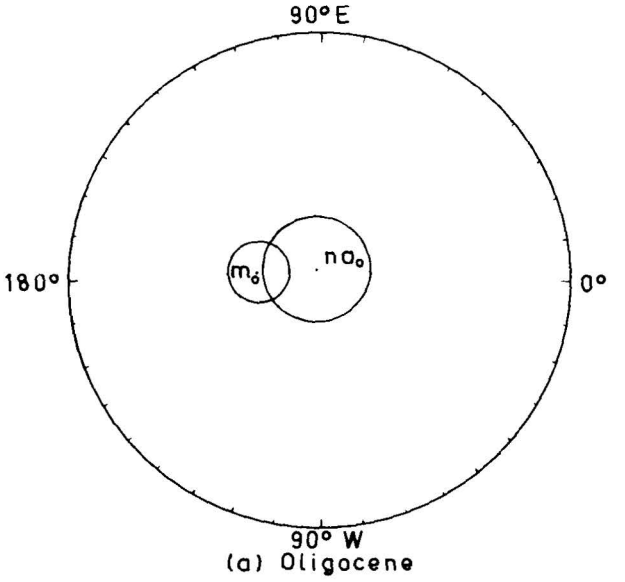
The above data can be interpreted in terms of a possible tectonic rotation of Mexico w.r.t. 'stable' North America. It should be mentioned however that much more data are needed before a quantitative tectonic model can be put forth.

TABLE 1

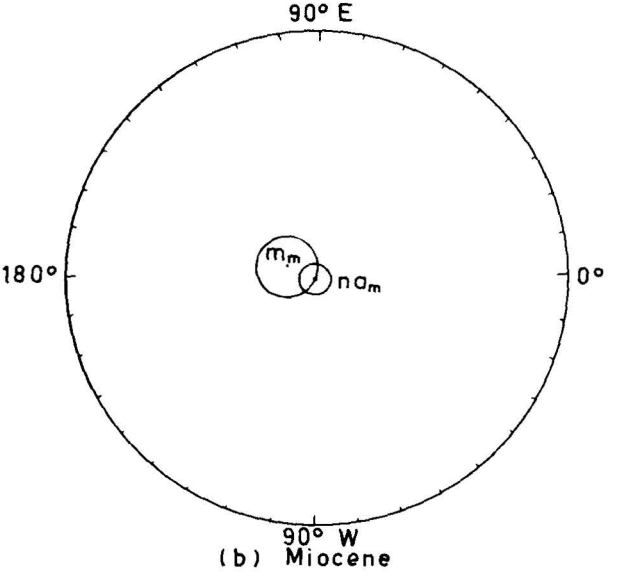
NEW POLE POSITIONS FROM WEST DURANGO VOLCANICS, MEXICO

Age (m.y.)	No. of sites (N)	Pole position			
		Latitude (N)	Longitude (E)	dp	dm
12	2	81°	242° *	–	–
23.5 ± 5	6	68°	176°	9	16
27.7	1	64°	257° *	13	15
28.5-31.5	13	63°	167°	7	12

* These positions are not used in the discussion as they might not be based on sufficient data.



(a) Oligocene



(b) Miocene

Fig. 1. Comparison of mean pole positions from Mexico and North America. (see text for symbols used).

BIBLIOGRAPHY

HICKEN, A., E. IRVING, L. K. LAW and J. HASTIE, 1972. Catalogue of paleomagnetic directions and poles. Dep. Energy Mines Resour., *Earth Phys. Branch Publ., 45:* 1-35.

NAIRN, A. E. M., J. F. W. NEGENDANK, H. C. NOLTIMIER and T. J. SCHMITT, 1975. Paleomagnetic investigations of the Tertiary and Quaternary igneous rocks X: The ignimbrites and lava units west of Durango, Mexico. *Neues Jahrb. Geol. Paleontol., Monatsh., 11:* 664-678.

PAL, S. and J. URRUTIA F., 1976. Tectonic rotation suggested by paleomagnetic data from Mexico. AGU Annual Meeting Program, 35, San Francisco (abstract).

PAL, S. and J. URRUTIA F., 1977. Paleomagnetism, geochronology and geochemistry of some igneous rocks from Mexico and their tectonic implications. Proc. IV International Gondwana Symp., Calcutta, India. (In Press).

URRUTIA F., J. and S. PAL, 1977. Paleomagnetic data from Tertiary igneous rocks, NE Jalisco, Mexico. *Earth Planet. Sci. Lett., 36:* 202-206.