PLATE TECTONIC ROTATIONS OR STRUCTURAL ROTATIONS IN HISPANIOLA?

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ABSTRACT

A paleomagnetic study of Cretaceous and Tertiary rocks in different tectonostratigraphic units from the Dominican Republic yields a polar arc distribution in the Lamberth azimuthal equivalent projection, centered on the sampling site. For 26 sites of Paleogene age, the polar arc is characterized by the radius of 70^0-90^0 paleocolatitude (p). The mean p = 77^0 corresponds to a paleolatitude of 13^0 N for the sampling area. The virtual geomagnetic poles show a distribution along the radius of the polar arc on both sides of the North American apparent polar wander path (NAAPWP). This indicates both anticlockwise and clockwise rotations in Hispaniola.

The tuffs of the Imbert Formation in the Cordillera Septentrional were deposited at 7^0 N of the paleoequator and then rotated 90^0 anticlockwise along the Camú fault zone, relative to the NAAPWP. Eocene limestones from the Hispaniola fault zone were deposited at 11^0 N and then affected by 56^0 clockwise rotation. In Sierra De Neiba a 50^0 anticlockwise rotation of volcanic rocks and lithographic limestones began already in the middle Eocene at 14^0 N. The Sierra de Bahoruco was located at 13^0 N in the middle Eocene. Since the Paleogene, limestones in the centre of this terrane have been affected by only 11^0 clockwise rotation. This is in contrast to the 108^0 clockwise rotation of basic volcanic rocks of the eastern margin of the terrane in the La Cienega complex. The volcanic rocks have been block rotated along the Beata fault zone.

The pole positions limit the paleolatitude of Hispaniola to 5^0 through 15^0 N. Large scale block rotations occurred along the main transcurrent fault zones which mark the boundaries of most of the terranes. The results are in accordance with the plate tectonic model of Mann et al. (1991) : the offset along the northern plate boundary zone of the Caribbean Plate is partly absorbed by large scale rotations along the suturing terranes in the vicinity of Hispaniola.