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°-90° paleocolatitude (p). The mean p
= 77° corresponds to a paleolatitude of 13° N for the sampling area. The virtual
g 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° N
of the paleoequator and then rotated 90° anticlockwise along the Camú fault zone, relative
to the NAAPWP. Eocene limestones from the Hispaniola fault zone were deposited at
11° N and then affected by 56° clockwise rotation. In Sierra De Neiba a 50°
anticlockwise rotation of volcanic rocks and lithographic limestones began already in the
middle Eocene at 14° N. The Sierra de Bahoruco was located at 13° N in the middle
Eocene. Since the Paleogene, limestones in the centre of this terrane have been affected
by only 11° clockwise rotation. This is in contrast to the 108° 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° through 15° 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.