PALEOMAGNETIC RESULTS

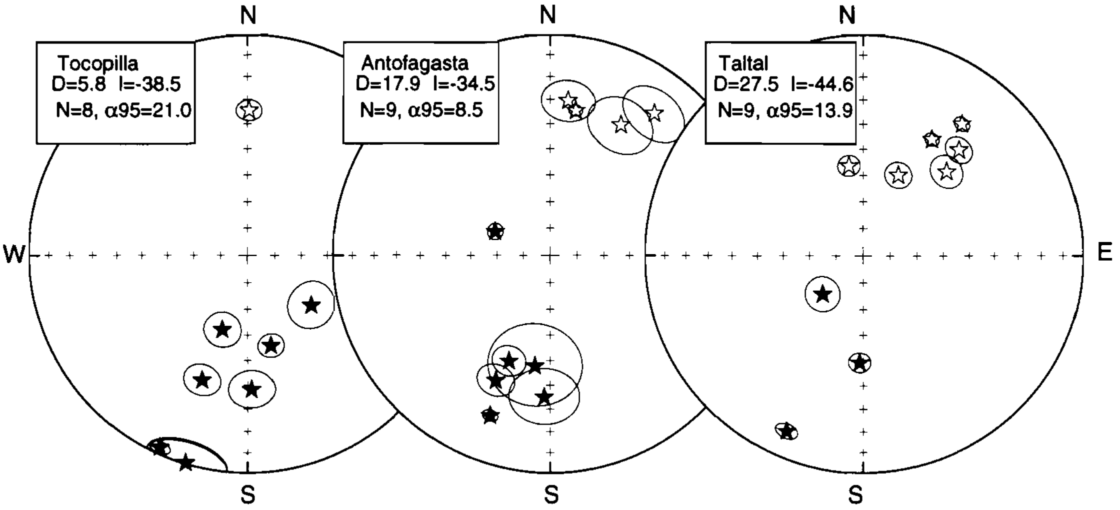

Figure 2: Paleomagnetic results from the Mesozoic arc.

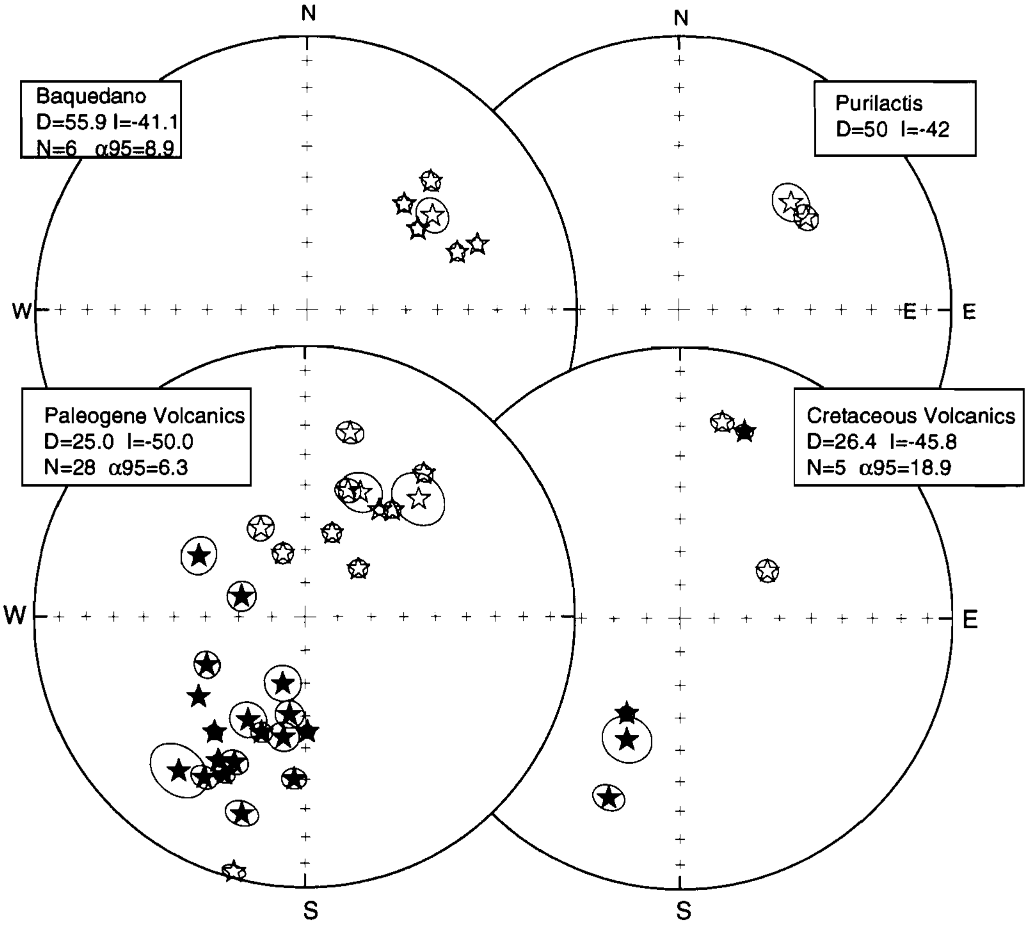

Figure 3. Paleomagnetic results from the area in between the Atacama and Domeyko faults system

The Jurassic volcanics

Magnetic susceptibility is usually high to very high (up to 0.1SI). Multidomain magnetite and maghemite is often the main magnetic carrier and secondary magnetizations are widespread. In the

Antofagasta area, in many cases, normal and reverse polarity magnetizations are found within the same flow. This behavior is likely associated to low temperature metamorphism during burial of the thick volcanic sequence. After detailed thermal and AF demagnetizations we were however able to determine a characteristic magnetization for several sites (Fig. 2).

Upper Cretaceous and Tertiary

Baquedano and Purilactis formation

East of Baquedano, about 70 Km NE of Antofagasta, the characteristic magnetization in the sediments and interbedded lavas corresponds to a remagnetization associated to an oxidizing event of possible hydrothermal origin. This remagnetization is however well defined and in good agreement with the primary magnetization recorded in a ryolitic lava located 10 km east of the Baquedano section. On average these sites record a clockwise rotation of about 60°. We sampled also 5 sites in the Quebrada Buitre but there is a large scatter between the sites. Only one section in the red sandstones and interbedded sills in the Tonel-Purilactis formation gave reliable paleomagnetic results; this section also documents large clockwise rotation (Fig. 2) and this result is in good agreement with a previous study in the same formation and located further north (Hartley et al., 1992).

Central Valley (East of Taltal from 24°45' to 26°)

For all sites, the characteristic magnetization was determined precisely with the majority of the samples showing univectorial magnetizations (Fig.3). After removal of 3 directions which are at more than 2 standard deviations from the mean, the mean declination is 25°. This result demonstrates that clockwise rotations are not restricted to the coastal domain.

Our new paleomagnetic results provide additional evidence for a tectonic process involving large clockwise rotations in northern Chile during the Tertiary. The differential along-strike shortening model of Isacks (1988) implies clockwise rotations during the Late Cenozoic by about 10°. Paleomagnetic results obtained in Bolivia (Butler et al., 1995; Roperch et al, this volume) suggest that the largest rotations occurred before 20Ma. Thus, the difference between the observed and expected (from the Isacks model) rotations emphasizes the importance of early-middle Tertiary tectonics in the structuration of the Central Andes.

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