



Oroclinal bending and mountain uplift in the Central Andes

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During the last two decades, numerous paleomagnetic studies have reported tectonic rotations in the Central Andes. The large paleomagnetic database now available allows a better understanding of the spatial and temporal variations of the rotations within the Andes. Clockwise rotations ($> 25^\circ$) are observed along the forearc of northern Chile (23-28°S) [Arriagada et al., 2006, *Tectonics*, doi:10.1029/2005TC001923]. These rotations are recorded in Mesozoic to Early Paleogene rocks. The scarce paleomagnetic data in Neogene rocks do not show rotation. In northernmost Chile (~18.5°S), there is no evidence for significant rotation. Along the forearc of southern Peru, counterclockwise rotations recorded by flat lying red-beds (Moquegua Formation) increase from about -30° (~17.5°S) to $> -45^\circ$ at ~15.5°S and rotations decrease with time from late Eocene to late Oligocene-early Miocene time [Roperch et al., 2006, *Tectonics*, doi:10.1029/2005TC001882]. In contrast with the large rotations found along the forearc in late Paleogene rocks, counterclockwise rotations of low magnitude (~ 10°) are found in mid to late Miocene rocks from the northern Altiplano and these rotations are concomitant with shortening in the sub-Andean zone and sinistral strike-slip faulting along the eastern edge of the northern Altiplano. Several recent Fission track and (U-Th)/He studies show evidence for strong exhumation within the eastern Cordillera and within the Puna plateau starting in the Eocene while structural studies indicate the majority of crustal shortening in the Eastern Cordillera occurred during Eocene-Oligocene time, with the final stages of deformation having continued through Early Miocene time. Thus rotations in the forearc are concomitant with deformation within the Eastern Cordillera. We interpret the rotation pattern along the southern Peruvian forearc as a result of a late Eocene- late Oligocene strong oroclinal bending of the Central Andes associated with a shortening gradient along the Eastern Cordillera es-

pecially within the Abancay deflection. Clockwise rotations in northern Chile likely occurred contemporaneously with the rotations in Peru and are the result of transpression with oblique convergence within the Chilean forearc but also across the Puna region during the late Eocene - Oligocene. Taking into account the shortening needed to account for oroclinal bending prior to the Neogene (~200km), a significant surface uplift in the region should have taken place before 20 Ma.