Geophysical Research Abstracts, Vol. 7, 09233, 2005
SRef-ID: 1607-7962/gra/EGU05-A-09233

Timing and Distribution of Crustal Rotations of the Tibetan Plateau: Implications on Geodynamic Reconstruction

G. Dupont-Nivet (1), W. Krijgsman (1), X. Fang (2), S. Dai (2)

(1) Paleomagnetic Laboratory - "Fort Hoofdijk", Faculty of Earth Sciences, Utrecht University, Netherlands; (2) Key Laboratory of Western China Environment, Ministry of Education of China (MOE), The College of Resources and Environment, Lanzhou University, China

Paleomagnetism is used to quantify the timing and distribution of deformation during the Indo-Asia collision recorded by tectonic vertical-axis rotations of crustal fragments. The compilation of existing paleomagnetic data indicates significant rotations limited to the western and eastern margins of the orogen. We obtained precise age control on these rotations through high-resolution magnetostratigraphic dating of inferred Upper Eocene to Lower Miocene lacustrine sediments of the Xining-Lanzhou region at the northeastern edge of the Plateau. These results indicate Late Oligocene (ca. 27 Ma) rotations implying that important deformation propagated far north of the collision zone soon after the initial Indo-Asia collision. This is in agreement with regional geological constraints arising from recent low temperature thermochronologic studies. This far-field deformation is compatible with early development of right lateral shear predicted by recent analogical models of the collision taking into account the effect of eastward slab roll back of the Pacific margin [Fournier et al., 2004; Northrup et al., 1995]. In addition, rotations are synchronous with initiation of other large strike slip systems (Red River Fault [Leloup et al., 1995] and Altyn Tagh Fault [Yue et al., 2001]) as well as early southward Tibetan subduction [Roger et al., 2000]. Coeval thrusting and strike-slip faulting within a large-scale transpressional system propagating far north of the collision zone provides a new tectonic mechanism with fundamental implication on lithospheric behavior in collisional context.