

2005 Fall Meeting  
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HR: 0800h

AN: **T41A-1280**

[Clockwise Rotation of Upper-Mantle Strain and Crust-Mantle Coupling Beneath the Eastern Syntaxis Tibet](#)

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We performed shear-wave splitting of core phases using a subset of 33 selected events within an array composed of 48 broadband stations that spans a 650x350 km area crossing the Lhasa and the southern part of the Qiangtang terranes. Our results reveal the presence of azimuthal anisotropy with small-to-moderate delay times (0.5-1.4s). The consistency of the splitting parameters with respect to back-azimuth, as well as the absence of splitting along propagation paths parallel to the symmetry axis, suggest that a single layer of horizontal anisotropy in the lithospheric mantle adequately explains the data at most of our stations. At regional scale, the most striking feature is the remarkable southeastward clockwise rotation of fast polarization axis around the eastern Himalayan syntaxis, a characteristic compatible with geomorphology, structural geology, paleo-magnetism and GPS. At a more local scale, our study region can be divided into various zones

based on similarity in the splitting pattern. The most remarkable zone is the one running parallel to the strike-slip fault associated with the Bangong suture, where we observe a suture-parallel fast direction rotating from E-W to SSE at the eastern edge of the syntaxis. This indicates a possible extent of faulting into the lithospheric mantle highlighting the role of strike-slip faults to accommodate the rotation of material around the syntaxis. Another significant feature is observed in the western part of the Lhasa terrane, where a clear change in fast direction from collision parallel to collision perpendicular occurs within a narrow N-S transition zone. The small-scale variations in the fast polarization orientation and the tendency of the fast polarization direction to align close to the direction of the surficial structures argue against anisotropy induced by absolute plate motion and support a general consensus in which anisotropy in the plateau has been developed by finite strain in the lithospheric mantle with a potential contribution from the crust. This argues for the presence of an effective crust-mantle coupling beneath the eastern syntaxis, in contrast with the presence of a low strength (weak) decoupling lower crust relative to the upper mantle that has been suggested by data from the central plateau and some geodynamic modelling of the whole orogen. Our results indicate that although the lithosphere in the syntaxis appears to deform internally, fault block rotation via strike-slip tectonics plays an important role in the southeastward extrusion of the plateau.

DE: 7203 Body waves

DE: 7208 Mantle (1212, 1213, 8124)

DE: 7218 Lithosphere (1236)

SC: Tectonophysics [T]

MN: Fall Meeting 2005

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