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TI Measurements of crustal thickness and Poisson's ratio in southeastern Tibet from receiver functions

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AB In this study we present new measurements of crustal thickness and Poisson's ratios for southeastern Tibet extending east from Lhasa across the eastern syntaxis. The syntaxis is characterized by the end of Himalayan orogen and the start of `escape' tectonics, as material is extruded from the central plateau and rotates around the corner of the Indian plate indentor. Depth to Moho and determination of Poisson's ratio were made by measuring the travel times of direct and multiple P to S converted phases from the Moho and solving jointly for depth and Poisson's ratio assuming a crustal average Vp of 6.4 km/s. The depth to Moho ranged in value from 55 to 75 km below sea level. These depth measurements can be divided into two regions, a moderately uniform, deep Moho, extending from the central plateau toward the eastern margin and a higher relief, shallower Moho within the core of the syntaxis. Poisson's ratio ranged from 0.21 to 0.29. These measurements can be divided into three regions, fairly homogenous low to intermediate values within the central plateau, predominantly low to intermediate values but localized high values (0.29) within the eastern margin, and a

wide range of values (0.21-0.29) over short scale lengths within the central syntaxis. No correlation is seen between Poisson's ratio and depth to Moho. The predominantly low to intermediate Poisson's ratios are indicative of a crust that is relatively felsic in composition compared to "average" continental crust. The lack of consistent high Poisson's ratio means there is no evidence for widespread partial melt within the crust, but does not rule out the presence of at least localized pockets of melt. To see if the depth of the Moho correlates with the surface topography correlation analysis was preformed with the surface topography smoothed over a range of 20-400 km. The best correlation occurs (r=0.75) when the surface topography is smoothed to 180km. This correlation can not however be explained by simple Airy Isostasy alone, it requires at least in part another mechanism controlling the thickness of the crust in this region. Such mechanisms could be variations in density or rheology within the lithosphere or for the region to be out of isostatic equilibrium.

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