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Seismicity in the eastern Himalayan syntaxis

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AB Previous studies of local seismicity in the Himalayan orogen and the Tibetan plateau have shown lateral variability in the depth of seismicity and in the fault types responsible for earthquakes. This study extends previous studies of seismicity with a local seismic network that was placed in the eastern Himalayan syntaxis. The syntaxis is a broad area of southeastern Tibet that marks the eastern edge of the Himalayan orogen and shows high gradients in GPS velocity, high rates of erosion, and at its core the syntaxis contains the young metamorphic massifs of Namche Barwa and Gyala Perri. The temporary seismic network was deployed for 15 months as part of the eastern syntaxis seismic experiment, a component of a larger interdisciplinary project researching the geodynamics of indentor corners. The array consisted of 70 seismometers in a regional array throughout much of the syntaxis with a focus on the massifs. Locations of earthquakes were determined from P- and S-wave arrival times, using a one-dimensional, three layer crustal velocity model. Initial results suggest that seismicity is primarily confined to the upper crust in the syntaxis, but the presence of a small number of deep earthquakes may be an indication that this distribution with depth is a tectonic rather than rheologic constraint. To the south of the syntaxis, the seismicity increases in depth, possibly related to subduction under the Burma arc. The area under Namche Barwa/Gyala Perri shows particularly high levels of seismicity, which may be a

consequence of the rapid uplift of the massifs. Several other localized areas show elevated levels of seismicity, which is likely related to rifts and localized faulting. An area to the west of the massif, within the Lhasa block, has relatively little activity, which may have implications for tectonic models of deformation. To the east of the massif, seismicity correlates with river valleys, suggesting their locations may be fault controlled. Focal mechanisms show that strike-slip, normal, and thrust faulting are all legitimate styles of faulting in the region, and the area under the massifs shows particular variability in focal mechanisms. This range in fault types is an indication of the rapid spatial changes in tectonic style that occur within the syntaxis.

DE: 7215 Earthquake source observations (1240)
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