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Predicting Tectonics From Topography: Case Study Using SRTM Data From the Namche Barwa Region, Eastern Himalayan Syntaxis, Tibet

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AB The eastern Himalayan syntaxis, Tibet, is a tectonically active region located at the `corner' of two colliding plates. As such, it is an ideal location in which to use NASA SRTM-derived topographic metrics to elucidate surface-tectonic interactions, especially around the rapidly exhuming Namche Barwa massif. In order to minimize the effects of differing lithology, the extraction of topographic indices was limited to basins draining the medium- to high-grade metasediments and gneisses on the west and north sides of Namche Barwa. Landsat TM data calibrated with field observations are used to identify the difference between bedrock and alluvial channels, as well as which portions of the landscape are controlled by glaciers and the difference between bedrock and alluvial channels. The Nyingqui River is a $\sim$SE-flowing, alluvial channel at its confluence with the NE-flowing Tsangpo. Elongate basins draining into the NE side of the Nyingqui trend NE-SW and average $\sim$200 km^{2}. Rounded basins that drain into the Tsangpo immediately downstream of the confluence trend N-S to NW-SE and are smaller, $\sim$60 km^{2}. Two basins that lie over the drainage divide to the north trend N-S and E-W and average $\sim$1500 km^{2}. The rivers draining into the Nyingqui exhibit convex-up long profiles, and their associated hypsometric curves indicate that a large percentage of this area is concentrated at higher elevations, well above the Nyingqui's base level. Asymmetry in these NE-SW trending basins and in the first basin downstream of the confluence indicate tilting to the NW. These trends change dramatically downstream of the Tsangpo confluence, where the long profiles range from graded to straight, hypsometry indicates more even distributions of elevation within the basins and asymmetry favors tilt to the E or NE, depending on the orientation of the basin. Asymmetry of the larger basins over the divide

suggest tilt in opposite directions, to the SE and the NW, respectively. Regional topographic residual and slope maps indicate that the basins draining into the Nyingqui and those on the other side of the divide have low local relief and slopes relative to the smaller basins that feed the Tsangpo. The systematic change of these metrics from basin to basin suggests recent tectonic influence, specifically regional uplift and tilting of this region to the NW, consistent with a network of well-constrained, low-temperature thermochronologic data (Malloy et al., 2003) by the larger NSF Geodynamics of Indentor Corners project.

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