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Strike-Slip Faulting in the Eastern Himalaya and Indo-Burman Plate Boundary Systems

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Northeast India is sandwiched between the seismically active plate boundaries of the Eastern Himalaya to the north and the Indo-Burman subduction zone to the east. This plate boundary system is different from the central Nepal Himalaya, due to oblique convergence across two orthogonal plate boundaries, resulting in a zone of distributed deformation both within and away from the plate boundary. Previous studies of spatial distribution and source mechanism of earthquakes have shown that the N20E convergence between India and Tibet is partitioned into N-S underthrusting and E-W subduction of the Indian plate beneath the Himalaya and Burma micro-plate, respectively. However, south-west of the plate boundaries, the middle-to-lower crust deforms by strike-slip faulting in the Kopilli Fault Zone (KFZ); upper-to-mid crustal strike-slip faulting along the western Brahmaputra Valley; and lower crustal strike-slip faulting beneath the Bengal Basin. Strike-slip faulting in the KFZ also extends northwards beneath the Eastern Himalaya and southeastward beneath the Naga fold-thrust belt. In order to understand the role of these strike-slip faults in accommodating the GPS derived convergence across northeast India, we study the source mechanism of recent earthquakes using teleseismic (for earthquakes with Mw>5) and local (4.0<Mw<5) waveform inversion. Our results of earthquake source parameters, directivity effects, and source mechanisms reveal dextral strike-slip faults in the KFZ and the western Brahmaputra Valley. We conjecture that the strike-slip faults in the Bengal Basin are reactivated passive continental margin rift faults with left-lateral motion. We will combine our results with previous studies of well-constrained source mechanisms and GPS velocity field to unravel the kinematics of active deformation across northeast India.