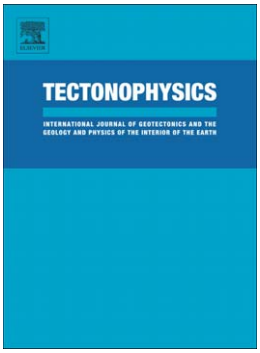

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Seismotectonics of the trans-Himalaya, Eastern Ladakh, India: constraints from Moment Tensor Solutions of local earthquake data

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Abstract

The seismotectonic scenario of northwest part of India-Asia collision zone is studied by analyzing the local earthquake data (M~1.4-4.3) recorded by a broadband seismological network consisting of 14 stations. Focal Mechanism Solutions (FMSs) of 13 selected earthquakes were computed through waveform inversion of three-component broadband records. Depth distribution of the earthquakes and FMSs of local earthquakes obtained by waveform inversion reveal kinematics of the major fault zones present in eastern Ladakh. A most pronounced cluster of seismicity is observed in the Karakoram Fault (KF) zone down to a depth of ~65 km. The FMSs reveal transpressive environment with an inferred strike slip fault plane parallel to the KF. It is argued that the KF penetrates down to the lower crust and is a manifestation of active under thrusting of Indian lower crust beneath Tibet. Two clusters of microseismicity are observed at a depth range 5-20 km at the northwestern and southeastern fringes of the Tso Morari gneiss dome, which can be correlated to the activities along the Zildat fault and Karzok fault, respectively. The FMSs obtained for representative earthquakes show thrust fault solutions for the Karzok fault, and normal fault solutions for the Zildat fault. It is suggested that the Zildat fault is acting as a detachment, facilitating the exhumation of the Tso Morari dome. On the other hand, the Tso Morari dome is under