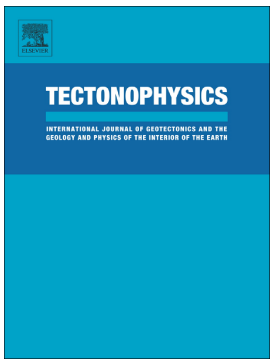

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Geodetic Imaging Mega-thrust Coupling Beneath the Himalaya

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Abstract

The 2015 Gorkha earthquake highlights the urgent need for understanding seismicity in the Himalaya, which is envisaged to be governed by stick-slip behavior on the Main Himalayan Thrust (MHT) beneath the southern edge of the Tibetan Plateau. We integrate GPS data in southern Tibet with those public available for geodetic imaging of the frictional properties of the seismogenic fault, aiming at a better understanding of the strain buildup on the largest continental mega-thrust and its relation to great earthquakes. The postseismic effects due to viscoelastic relaxation from three large earthquakes (1934 Bihar Mw 8.4, 1950 Assam Mw 8.5 and 2005 Kashmir Mw 7.6) are corrected in the coupling modeling. The new model, constrained by all GPS velocities, spirit levelling rates and InSAR interferograms spread between the eastern and western Himalayan syntaxes confirms previous findings that the MHT is fully locked in the uppermost 15-20 km of crust, below which an abrupt decrease in coupling occurs with coefficients reduced from 0.8 to 0.2 within a narrow transition zone of 30-50 km in width. Generally, the coupling pattern is modified little after removing the postseismic contributions of the 1934 Bihar and 2005 Kashmir earthquakes from GPS velocities, meanwhile, the