Geodynamics of the NE India: Inferences from GPS and Geophysical Investigations

C.D. REDDY, P.S. SUNIL AND SANJAY K PRAJAPATI

Indian Institute of Geomagnetism, New Panvel, Navi Mumbai – 410218, India
cdreddy@iigs.iigm.res.in

Collision of India and Eurasian plates resulted in the formation of Himalaya. The NE Himalaya arc (comprising a series of successive thrusts viz. HFT, MBT, MCT), eastern syntaxis (a complex triple junction that joins the Indian and Eurasian plates with the northern end of the Burmese plate) and Burmese arc (where an oblique convergence between the Indian and Burmese plates taking place) provide numerous fascinating seismotectonic and geodynamic problems to investigate. The strain rate measurements using space borne technology (e.g. GPS, InSAR) and moment tensor analysis of earthquake data, supplemented by potential fields e.g. gravity and magnetic, play an important role in studying the geodynamic processes. For the present study, we chose an area confined to longitude 86^{o} E -100^{o} E and latitude 26^{o} N -31^{o} N with different litho-tectonic signatures.

Five year of GPS data from two continuous and thirteen campaign mode sites have been analyzed yielding horizontal velocity in ITRF2005, Indian and Eurasian reference frames. The velocity distribution further used in estimating the dilatation and shear strains and angular velocity. The high dilatational field correlates well with the MBT and MCT zones of Himalayan region. Maximum shear strain is observed along the Sagaing fault where the active deformation related to the northwards motion of India is distributed. Moderate to high range of dilatation strain present in some regions of Indo Burmese Arc (IBA), near to the intersection areas of Kopoli, Dauki faults and IBA. Clockwise rotation rate of the plate is higher on the Eastern Himalaya Syntaxis where the deformation trend of the Tibetan plateau changes from ENE to ESE. Strain rate pattern and gravity anomalies positionally correlate well with the distribution of earthquake epicenters in NE Himalayan arc region while this is deceptive in Burmese arc region. Low viscosity is seen all along the NE Himalaya thrust zones and east of the Burmese arc indicating ongoing intense seismic activity in these regions. The region between MBT and the Shillong Plateau seems to be seismically very active and needs focused study.

Keywords: Northeast India; Geodynamics; GPS, Strain; Stress; Rotation