Spatio-Temporal changes in seismic behaviour and their signatures on topography as analysed in the NE India using remotely sensed data

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Seismotectonic studies of the NE Indian region and analyses of the seismological and remotely sensed data (using satellite imageries) have been carried out.The NE Indian region is the eastern most extremity of the Himalayan mountain chain, which is tectonically and therefore, seismologically active belt of the world. It lies at the convergence of the Indo-Australian and the Tibetan plates. The axis of convergence of this belt trends nearly in WNW-ESE direction, which, however, takes southerly trend in the NE Indian region, extending through Burma into the Andaman-Nicobar island chain. This region, therefore, is the syntaxis of the convergence belt, because of which it had become much active seismologically.

The seismological data has been collected from United States Geological Survey (USGS) and International Seismological Centre (ISC), from the year 1950 onwards till 2008 for the NE Indian region. Plots of epicenter distribution have been made decadal wise, i.e. 1971-80, 1981-90, 1991-2000 and 2001-2008 of the seismic events with the magnitude greater than 5.0 on Richter scale. These plots show the preferred distribution of earthquake epicenters, indicating the planes of weakness through which the crustal stresses get released. It is also
apparent that these planes of weakness are evidenced on the surface by certain structural/tectonic fabric, represented more commonly by lineaments, faults and thrusts.

To understand the spatio-temporal trend of release of stresses, remote sensing data in the form of optical satellite imageries of IRS (Indian Remote Sensing Satellite) IA, IC and ID have been examined for the years 1988-2002 covering the same area. It is observed that trend of release of crustal stresses is reflected in the changing pattern of drainage characteristics, which is evidenced by the characteristic change in flow

pattern of the streams that originate of the base of the mountain front and flow nearly in southern direction. It is observed that streams originating from the base of the mountain chain and flowing nearly in south direction show characteristic changes in flow patterns.

These studies reveal the close correlation between epicentral distribution and changes in drainage characteristics through time. It can be summarized therefore, that the analysis of the remote sensing data, coupled with the epicentral distribution of seismic events can yield signatures by way of topographic changes, which may reveal the probable areas of impending future earthquakes.