PERMANENT, SEMI-PERMANENT AND CAMPAIGN-MODE GPS NETWORK

Indian GPS Programme for Earthquake Studies

In 1998 the Government of India Department of Science & Technology (DST) launched a National GPS Programme for Earthquake Hazard Assessment. The recent major earthquakes in the South East Asian region, and damage caused by the 2004 Tsunami, have demonstrated once again the importance of such a programme. This now includes a network of permanent, semi-permanent and campaign-mode GPS stations, today at an advanced stage of implementation.

The Himalayan region is seismically active and needs monitoring for earthquake hazard. Further, the Peninsular Shield of India can no longer be considered to be seismically inactive, as shown by the Koyna, Latur and Jabalpur earthquakes.

Programme Focus

After the Latur earthquake in 1993 a UN Expert Committee recommended the establishment of dense GPS and precise vertical control for this region to monitor seismotectonic activities. In 1998 the Department of Science & Technology (DST) made material the above recommendations by laun-ching an extensive â€˜National GPS for Geodynamics Programmeâ€™. A National Committee constituted to oversee the programme reported on activities in February 2005 (DST, 2005, see Further Reading). The entire network will consist of 43 permanent GPS stations, about seven hundred semi-permanent (campaign-mode) GPS stations in the Himalayan regions and the peninsular shield of India, and many more field-GPS stations being established and monitored for local campaigns. The programme focuses on the following issues:

- determination of strain fields around different tectonic blocks in areas such as Bhuj, Son Narmada Lineament, North Western and Eastern part of Himalaya, the Khandwa region of Madhya Pradesh, the Ongole area of Andhra Pradesh, and the Great Boundary fault
- stability of the South Indian Peninsula
- crustal deformation studies along major shear zones
- motion and active deformation of India
- geodynamic behaviour of Himalaya
- crustal deformation studies along Eastern and Western Ghat regions
- neotectonic movements, study of active faults, landslides etc
- quantitative geomorphology
- ionospheric modelling
- manpower development in GPS technology, SAR Interferometry and Terrain Modelling using Airborne Lidar.

Campaigns

Permanent GPS Stations have now been set up in thirty locations all over the country. Five are presently under construction, whilst eight are proposed for completion in 2006. In order to estimate regional crustal strains, and to identify and monitor seismically active regions, a network of about 700 semi-permanent GPS Stations is being set up. This covers the entire country, and the spacing between stations is about 40km to 60km. As far as possible, existing stations of the Great Trigonometrical (GT) Triangulation Network of India are included in the network. To study the local crustal deformation process in seismically active areas, campaign-mode studies have been taken up by various participating institutes in eleven areas distributed over the whole of India. A National GPS Data Centre has been established at Survey of India, Dehradun. All the GPS data from permanent, semi-permanent and campaign-mode GPS stations is transmitted to this Data Centre, either in real time via the internet or VSAT-connectivity, or, where a real-time data link is yet to be established, periodically by off-line modes. The data is stored, managed and disseminated to the user community from this Data Centre for further processing.

Concluding Remarks

The National GPS Programme for the Earthquake Hazard Assessment programme will continue to contribute significantly to our understanding of plate motion and crustal deformation in the region. The programme will also contribute to the development of models for earthquake-hazard assessment.

Further Reading

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