

Notes

SEISMICITY OF THE NORTH-EAST INDIA REGION

(THE AUGUST 6, 1988 EARTHQUAKE IN THE VICINITY OF INDIA-BURMA BORDER : A MEDIUM-TERM EARTHQUAKE PREDICTION COMES TRUE)

There is a world-wide effort to study and identify spatial and temporal variation of seismicity and recognize patterns that precede earthquakes. Gupta and Singh (1986) carried out a detailed study of earthquake swarms and quiescence which precede major earthquakes in the north-east India region and concluded :

1. ' Moderate magnitude to great earthquakes in the north-east India region are found to be preceded, generally, by well-defined earthquake swarms and quiescence periods.
2. On the basis of an earthquake swarm and quiescence period, an area bound by 21°N and $25\frac{1}{2}^{\circ}\text{N}$ latitude and 93°E and 96°E longitude is identified to be the site of a possible future earthquake of $M 8 \pm \frac{1}{2}$ with a focal depth of 100 ± 40 km. This earthquake should occur any time from now onwards. Should it not occur till the end of 1990, this forecast could be considered as a false alarm'.

These results were also reported in the Symposia ' Earthquake Hazard Assessment and Prediction ' held during the XIX IUGG General Assembly at Vancouver, Canada, in August 1987 (Gupta and Singh, 1987). In the parlance of earthquake prediction, this constitutes a medium term prediction. It may be also noted that no earthquake of $M 8 \pm \frac{1}{2}$ had occurred in the north-east India region and its vicinity since August 17, 1952.

The occurrence of August 6, 1988 earthquake, with focal parameters (National Earthquake Information Centre, U. S. G. S. preliminary determination, personal communication, TIM HITCHCOCK of U. S. Geological Survey, Menlo Park, California), as given below, makes the prediction come true :

Earthquake parameters	Prediction (Gupta and Singh, 1986)	Occurrence USGS (Preliminary)
Epicentre	$21^{\circ}\text{N}-25\frac{1}{2}^{\circ}\text{N}$ $93^{\circ}\text{E}-96^{\circ}\text{E}$	25.116°N 95.171°E
Magnitude (M)	$8 \pm \frac{1}{2}$	$7\frac{1}{2}$
Depth	100 ± 40 km	115 km
Time	Feb. 86-Dec.90	00 : 36 : 26.9 (G.C.T.) August 6, 1988

It is also worthwhile recalling the observation made by Gupta and Singh on p. 403, *Jour. Geol. Soc. India*, v. 28.

'One problem with the above forecast is its being singular. Should it come true, we would have 100% success and in case it does not come true we would have a 100% failure. Considering the scientific content of our work, neither is justified. Ideally, we should find several more similar situations elsewhere in the world so that the applicability of recognition of precursory earthquake swarms in real time for forecasting earthquakes could be more reliably tested'.

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References

- GUPTA, H. K. and SINGH, H. N., (1986) Seismicity of the North-East India Region, Part II: Earthquake Swarms Precursory to Moderate Magnitude to Great Earthquakes. *Jour. Geol. Soc. India*, v. 28, 1986, pp. 367-406.
- (1987) 'Earthquake Swarms Precursory to Moderate to Great Earthquake in the North-East India Region', Earthquake Hazard Assessment and Prediction, Symposium, Abstract S1-45, XIX IUGG General Assembly, Vancouver, Abstract v. 1, p. 270.

The fact that a major earthquake has occurred in the NE India region as predicted warrants the inference that the authors of the study (Gupta and Singh, 1986) are on the right track. There appears to be alternating cycles of low and high seismicity in the Himalayan-Alpide Belt. The occurrence of three shocks of severe intensity (NE region of 6th August 1988; Hindu Kush region of 6th August 1988, North Bihar and Nepal of 21st August 1988) within the last one fortnight is a pointer that we are entering a period of high seismicity. We would, therefore, urge a closer examination of the data base, a reverification of inferences drawn and an intensification of research in this important field. —*Editor*