

NOTES

WORKSHOP ON UTTARKASHI EARTHQUAKE OF OCTOBER 91

National Workshop on Synthesis of Uttarkashi Earthquake Data of 20th October, 1991 and Seismotectonics of Garhwal-Kumaon Himalaya was held on 12th and 13th Nov.1992 at Pirojsha Godrej Centre, Lodi Road, New Delhi-110 003. The Workshop was divided into two themes viz., theme I devoted to Seismotectonics of Garhwal-Kumaon Himalaya and theme II to the Uttarkashi Earthquake. More than 50 participants attended and 25 technical papers were presented in these sessions.

Considering the views on the contributions made by the panelists and remarks by the chairman and general consensus of the house, the following recommendations were made:

1. Seismotectonics of Garhwal-Kumaon Himalaya and adjoining areas being complex in nature, due to transverse fractures/lineaments which define EW boundary of seismic source regions, a limited spatial window of about 50x30 km should be outlined between Bhagirathi and Alknanda basins for undertaking integrated and intensive studies to constrain dimensions and boundaries of seismogenic blocks.
2. Geodetic measurements by Survey of India need to be strengthened for better coverage and geotectonic correlations, SOI to organise a limited workshop for user agencies to elucidate procedures of data collection, reduction and interpretation presently adopted by them.
3. Theoretical studies leading to modelling should be undertaken and results presented in a workshop, with limited participation, to bring out better correlation and comprehensive synthesis of the data collected by different groups. For this purpose raw and processed data should be made available in DST.
4. Publication/proceedings of the National Workshop should be brought out in a fully edited volume. The second volume may include representative raw and processed data and methodologies.
5. Data flow mechanism between the institutions/groups is lacking and steps need to be urgently initiated for establishing a centralised data base equipped with modern facilities. Various groups should facilitate this task by timely transmission of the available data and also future data, to DST.
6. To supplement existing seismic observations, 2-3 geophysical observatories, fully equipped to monitor precursory earthquake parameters should be established.
7. In order to promote indigenous efforts in instrumentation, existing facilities in IMD, UOR and CSIO, Chandigarh should be strengthened. The instruments already developed by university of Roorkee (DEQ), CSIO, Chandigarh should be fully field tested and their performance evaluated.
8. Local variations in the recorded accelerations being inevitable the concerned agencies should specify range of acceleration values for particular areas.
9. Standardisation of strong ground motion instruments should be done for better response and comparison.

10. Post disaster relief measures should be properly organised, co-ordinated and monitored taking into account the community response.
11. It is recommended that a D.S.S. profile should be shot from Indian shield (if possible from Delhi) to the MCT or beyond to provide better data on velocity structure and Moho configuration in the area.

*Department of Science & Technology
New Mehrauli Road, New Delhi, 110 016*

G. D. GUPTA

MULTIDISCIPLINARY TECHNIQUES IN MINERAL EXPLORATION - A CASE STUDY

Mineral exploration strategies are becoming exceedingly complex with the leads from old workings fast running out and serendipitous discoveries becoming increasingly rare. Conceptual modelling is rapidly becoming the forte in mineral prognostication. Such modelling calls for the creation of a vast data base through multidisciplinary studies, and their rigorous analysis using computer. An exemplary effort in this direction is the EEC-funded joint R & D programme by the Geological Survey of Spain (ITGE) with the Southampton University (U.K.) and other agencies in Spain (ENUSA) and Portugal (ENU). The fundamental aim of the programme was to develop new mineral exploration strategies in the search for Sn, W, Nb, Ta, Li, Sb, Au, and U in the Iberian Peninsula. The results of this interesting exercise, carried out during 1987-1990, are published in neatly got up volume (109 pages) titled "Development of New Multidisciplinary Techniques for Mineral Exploration in several areas of western Iberian Peninsula", edited by P.Gumiell, C. Anton-Pancheco and R. Campos and published by the Spanish Geological Survey in 1991.

The focus of the multidisciplinary study was the La Codocera area of the western Spain which forms part of the terrane called Central Iberian Zone, bounded by major shear zones of the Hercynian orogen. The exploratory work commenced with the synthesis of geological maps followed by detailed structural analysis which revealed the important role of transpressive tectonics in the evolution of the terrane. This was followed by geochemical surveys, initially of panned heavy mineral concentrates and then by detailed stream sediment sampling, soil geochemical surveys and lithogeochemical surveys. Detailed geochemical maps were generated using standard computer programmes and three potential gold-bearing areas so identified were drilled and set apart for detailed exploration. A large amount of new data was generated on gold mineralisation through fluid inclusion studies, sulphide geothermometry, thermoluminescence and betaautoradiography. The studies showed that the auriferous veins formed from dilute 350°C, CO₂-rich fluids at 10-13 km crustal depths. These fluids had a shear zone origin and interacted with black slate wall rock to precipitate gold, which was lattice bound within arsenopyrite.

Bouguer gravity anomaly map was produced by establishing gravity bases. Selected anomalies were studied by gravity modelling using computer programme. The data were then integrated with geological map from which the 3-D configuration of granitic bodies was deciphered and extension faults were picked up. Landsat Thematic Mapper multispectral data were analysed using standard image processing techniques to produce different types of colour composites. The Landsat data used in conjunction