

Spatial technologies for natural hazards and management*

About 160 scientists, professionals and students from various institutions participated in the two-day Convention and Symposium of the Indian Society of Remote Sensing. Seven foreign scientists from Germany, USA and Japan also participated and presented papers. The theme of the Symposium was 'Spatial Technologies for Natural Hazards and Management'. The theme was important for the people of Uttar Pradesh (UP) who witness various kinds of natural hazards every year like the recent Uttarkashi and Chamoli earthquakes, Malpa landslide, numerous forest fires, snow avalanches in the Himalayan region, droughts and lightning.

In his inaugural address, S. K. Acharyya (Director General, GSI) drew the attention of the earth scientists and the remote sensing community to the basics of earth system and called on them to formulate strategies and plans to meet the challenges of natural hazards, increased needs of minerals, metals and energy for the industry to feed the increasing population, taking note of environmental impact of unplanned anthropomorphic exploitations and plan for remedial actions. He stressed the significant role of remote sensing and GIS for the earth scientists.

In the special technical session on 'natural hazards', three invited papers and five contributed papers were presented. The invited paper on the 'Use of satellite data for avalanche prediction and control' by S. S. Sharma [Director, Snow Avalanche Study Establishment (SASE), Chandigarh] dealt with the importance of multi-date remotely sensed data to monitor snow cover by different snow-cover simulation models. This was demonstrated with the help of a multimedia presentation. The efforts being made by scientists from SASE in generation of digital terrain model and studies of the slope aspect, change in the snow surface structures and properties were presented. Manfred Buchroithner (University of

Dresden, Germany) presented an invited talk on the 'Use of remote sensing data for natural disaster preparedness'. He presented zonation of landslide hazards using Landsat and SPOT data and also aerial photographs. For this purpose, use of landuse, drainage, geomorphology, landslide distribution maps was demonstrated. He also stressed on the role of radar interferometry for earthquake forecast. The use of remote sensing data in mud flooding forecast, 1 to 12 days before it occurred, was presented.

A review on 'Applications of SAR interferometry: Limits, options and perspectives' was presented by Hiroshi Kimura (GIFU University, Japan). He gave a detailed account of multi-data SAR interferometry for earthquake and landslide studies. GPS measurement of the movement rate at different points to develop interferogram over 44 days and 88 days time gap was demonstrated. The interferometry study capability of ALOS satellite to be launched in 2003 by the Japanese Space Agency was also presented.

'The application of air-borne altimetric LIDAR in disaster management' presented by Bharat Lohani (BHU, Varanasi) included the applications of LIDAR for coastal land problems, landslides, hurricanes, avalanches and air pollution studies. The advantage of canopy penetration by LIDAR was emphasized.

S. Dutta (SAC, Ahmedabad) presented the application of IRS P4 and Radarsat data for assessment of damage due to the super cyclone that occurred in Orissa in October 1999. Okhimath landslides and their impact assessment on the Madhyamaheswar and the Kaliganga watersheds using high resolution IRS 1C/1D data was presented by M. M. Kimothi (SAC, Ahmedabad). He has used temporal IRS data to map changes in the general land-use of the area. Detailed studies of slope, aspect geology and landslides were carried out to assess impact of landslide in Okhimath region of UP.

Vimal Kumar (GSI, Shillong) using multi-date satellite data, identified hazard-prone areas in the Brahmaputra valley, Assam. Major hazards identified by him in the valley are floods, riverbank erosion, water logging, seismic activities and river migration.

Modelling of erosion intensity in Himalayas was demonstrated by A. K. Joshi (RRSC, Nagpur) using GIS and remote sensing data for preparing erosion intensity map of the Himalayan region. Multi-date remote sensing data showed changes after treatment in some of the watersheds and also showed that the erosion has reduced in some areas due to such treatment.

In the technical session on 'Geomorphology, hydrology and snow', B. J. Choudhury (NASA, USA) gave an invited talk on the application of satellite data to evaluate evaporation and vegetation productivity of selected river basins of different parts of the world. The application of remote sensing data in determining various surface and meteorological parameters in evaluating evaporation has been illustrated. S. K. Ambast (IIT, Delhi) illustrated the importance of hydrological modelling with remote sensing in irrigation system management. P. C. Joshi (SAC, Ahmedabad) presented the utility of IRS P4 MSMR data in retrieving surface-specific humidity over the Arabian Oceanic region.

In the evening of 21 November 2000, Govind B. Pant (Director, Indian Institute of Tropical Meteorology, Pune) gave the Vikram Sarabhai Memorial Lecture on 'Weather-based natural hazards and their management'. Pant gave an account of the role of weather on natural hazards like drought, floods, tropical cyclones, thunderstorms, hail storms, dust storms, fog, haze and mist. Looking at the huge loss of life and property due to natural hazards, he stressed the need for disaster management, advance warning, rescue and relief.

The second day of the Symposium started with a special session on students' presentation, which was well attended by 48 post-graduate and research students from various institutions.

In the technical session on 'Air pollution', S. Mukai (Kinki University, Japan) presented an invited paper giving detailed account of aerosol retrieval techniques using various remote sensing data over ocean and land. Important area of polarization and radiance in the visible and NIR wavelength were stressed. A special algorithm was presented by Mukai in aerosol retrieval using look-up table method. The importance of ground-

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MEETING REPORTS

based measurements in validity of POLDER satellite data over southern Indian Ocean was also emphasized. K. V. Prasad (NRSA, Hyderabad) presented his work related to trace gas emission from biomass burning of secondary mixed deciduous forest estimates from satellite and ground-based measurements in the, Eastern Ghats area, Andhra Pradesh. Use of IRS-P4 OCM data and ground truth data to quantify a few trace gases during pre- and post-burning was presented. Different components of biomass combustion have been calculated and correlated with the satellite data, which was found to give good results.

In the technical session on 'Forest and agriculture', Indrani Chaudhary (SAC, Ahmedabad) demonstrated the use of

Radarsat data acquired in 24-days repeat cycle in monitoring different stages of rice crop growth. B. M. Singh (INRIMT, Dehra Dun) presented the utility and cost effectiveness of IRS III and PAN data in sodic land mapping of UP. M. S. Yadav (RSAC, Lucknow) presented the application of multi-date multi-stage monitoring of sodic lands in a part of Pratapgarh district, UP using remote sensing and GIS. Vegetation detection through remote sensing in extreme arid zone was presented by S. Kumar (CAZRI, Jodhpur). He brought out the limitations of remote sensing techniques for vegetation mapping, in particular in the desert land of western Rajasthan.

Mapping of planform cyclicality in an unstable reach of Sarda river using

remote sensing and GIS was presented by K. Rajarajan (RSAC, Lucknow), who described the use of multi-date satellite data in conjunction with GIS and its use in identifying and delineating river channel changes in the middle reach of the Sarda river. It was indeed encouraging to note that use of multi-date satellite data is being made in studying the dynamic aspects of river channels, which is the basic requirement while planning for river training measures leading to combat floods and erosion on the water.

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NEWS IN BRIEF

News from SAC-C

The second meeting of the Scientific Advisory Committee to the Cabinet (SAC-C) chaired by A. P. J. Abdul Kalam, Principal Scientific Adviser to the Government of India, was held on 3 November 2000 in New Delhi. It was poorly attended by members from the industry and thus sprang a few surprises. SAC-C is a body primarily for tendering advice on S&T policies and programmes of the Government of India and their implementation.

According to the official press release, the following items were considered in the above meeting. SAC-C recommended a programme of action by the government, for which it identified specific projects for developing 'critical technologies in the country with forward strategic thinking and with forward engineering'. SAC-C members were appraised of the India Millennium Mission-2020 (IMM-2020), wherein programmes have been 'worked out to transfer India into a developed nation within 20 years, focusing on wealth generation and wealth protection'. A report of the sub-committee, on private sector initiative in higher S&T education

is now finalized. The report, submitted to the Ministry of Human Resource Development, 'welcomes' private sector participation while suggesting 'some regulation to rule out purely market-driven structures for faculty, students and course contents'.

Another sub-committee report on 'all aspects of simplification of administrative and financial rules and procedures in scientific ministries, departments and institutions' has been prepared. Among the recommendations of this report are those for increasing the financial limits from the existing amounts, for approval by scientific ministerial departments and providing 'real' functional autonomy for R&D autonomous institutions and removal of 'blanket and routine budgetary' cuts inflicted on scientific institutions. For furthering scientific activity, 'mobility' of scientists would be encouraged. Approval time for sponsored research projects would be 'within a month' after peer review. A Science and Technology Audit Board would be formed in the C&AG's office and this would have in addition, two part-time

members nominated from the S&T community.

Women, in the S&T arena, also figured in a sub-committee report on 'maximal utilization of the human resource of women S&T personnel'. The report sent for approval to the Group of Ministers on S&T recommends the following:

1. Relaxation of age of recruitment of women S&T workers by 5 years, to allow them to rejoin and restart.
2. A provision for additional months of 'leave without pay', beyond 135 days of maternity leave.
3. Facilities for a good creche within the campus for infants and children up to 5 years.
4. Flexible working hours for women.
5. Husband and wife to be posted in the same station.
6. Transportation to be provided during late hours of work.
7. Special schemes to be initiated that are suitable for women.

Nirupa Sen