

To take advantage of the advances in grid computing and grid storage technologies, Orcutt (jorcutt@ucsd.edu) advocates the establishment of a broad, scientific, multi-purpose system, to cover natural resources management and hazard warning and mitigation, on a global scale, on the lines of the not-for-profit National Lambda Rail system that is used in major cyberinfrastructure projects.

'Around the shores of the Indian Ocean, 300,000 people are dead today because the world's governments have not grasped the need to use our understanding of the Earth more effectively. Earth scientists are concerned that their knowledge of the Earth, which could save lives and livelihoods, is underused.' (preamble of the brochure of the project, Planetearth – Earth Sciences for Society). At the instance of IUGS and UNESCO, UN is about to proclaim 'The International Year of the Planet Earth'. The Science programme and the Outreach programme of Planet Earth are based on eight socially-relevant, multidisciplinary themes:

groundwater, hazards, health, climate, resources, deep earth, ocean and megacities. Earth science institutions in India could participate in the programme by making proposals (see www.esfs.org for details).

A new international programme called The Electronic Geophysical Year (eGY), 2007–2008, on the lines of the International Geophysical Year, 1957, has been launched at the time of the Joint Assembly, New Orleans, USA. We are on the threshold of a new revolution in our standing of the Earth and geospace. This has been made possible by the dramatic increase in the number of observation networks on the ground, in the oceans, in the atmosphere, and in space, and advances in digital communications and information management methodologies. eGY seeks to promote multidisciplinary research through establishment of virtual observatories that will allow diverse data from several places to be combined through a single portal. Teachers in the geoscience departments in India could get connected to these virtual

laboratories for getting instructional materials, virtual seminars, computer-based animations and interactive simulations, student assessments, etc.

The only way for the geoscience departments in India to get over the inadequacies in quality of the faculty, library and laboratory facilities, is to go in for interactive instruction through being linked to virtual facilities, as mentioned above. Time was when it was adequate for a geology student to have a hammer, hand lens and clinometer-compass. Now, additionally, every geoscience student needs to have access to a computer with Internet connection.

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U. ASWATHANARAYANA

*Mahadevan International Centre for
Water Resources Management,
Hyderabad 500 033, India
e-mail: uaswathanarayana@yahoo.com*

Early warning of natural hazards using satellite remote sensing

In the last one decade, numerous satellites with multi-sensor operational capability in the broad electromagnetic spectrum (visible, infra-red and microwave) were launched by NASA, ESA, CNES, ISRO, Brazil and Chinese space agencies and a few private industries. These multi-sensor satellites have capability of monitoring land, ocean, atmosphere and ionosphere globally during day and night and also during cloudy and clear sky conditions. The recent information¹ on Global Earth Observation Systems (GEOSS) gives a hope to the scientific community for better capability for monitoring land, ocean and atmosphere at higher spatial and temporal resolutions in the next 20 years. In the last decade, multi-sensor satellite data have shown a great potential in monitoring and mapping damages caused by various types of natural hazards (earthquakes, landslides, floods, volcanoes, cyclone/hurricanes, harmful algal blooms, water quality, oil spills, dust storms, droughts, etc.). Recently, on 20 October 2004, UN Outer Space Commission in its General Assembly of the UNISPACE III proposed a possibility of creating an international entity (Disaster Management International Space Coordination – DMISCO)

to provide coordination for and optimizing the effectiveness of space-based services for use in disaster management.

MAGSAT satellite launched by NASA operated since 1979/80 and has provided data related to variations in the magnetic field for the past 20 years. These data have been useful in deducing internal structure of the earth down to length scales that was previously inaccessible. With the recent launch of the Danish Oersted satellite, 20 years after the 1979/80 MAGSAT, two data sets at two different epochs are now available and are being used to construct high-degree spherical harmonic models of the geomagnetic field. These two (Oersted and Magsat) satellite data have provided small-scale structure of the geodynamo and understanding of the geodynamo model.

Following the success of MAGSAT and Oersted missions, efforts are being made for the early warning of natural hazards using satellite remote sensing data. Among all natural hazards, earthquakes are one of the most devastating ones. Over several decades, efforts have been made to study precursors on the ground to predict an earthquake. Efforts are also being made

by scientists to monitor geological plate motion and to use such information to estimate stress accumulations in various regions.

Scientists have also found great potential of INSAR in monitoring surface deformation due to volcanoes, landslides, subsidence, mass movements in earthquake, and rockslide prone regions. The satellite and airborne remote sensing data have shown a great potential in damage assessment after various catastrophes. Efforts are also being made to get early warning information about an impending earthquake using numerous types of remote sensing data. Seismo-electromagnetic studies have been made over a few decades and ionospheric anomalies associated with earthquakes have been investigated² since 1980. Soon after the Gujarat earthquake (26 January 2001), various land, ocean and ionospheric anomalies associated with the earthquake were found^{3,4}.

Seismologists and solid earth scientists have strong reservations about the precursors being observed from satellites-remote sensing data, since they do not find existing theoretical models to explain satel-

lite-observed precursors such as land surface temperature, surface latent heat flux, cloud cover and total electron content. Scientists working with satellite remote sensing data related to earthquake applications, strongly believe that the changes observed on land, ocean, atmosphere and ionosphere are associated with the strong coupling between land-ocean-atmosphere-ionosphere. There is strong need to understand the earth processes associated with the earthquakes, that can be understood only if the earth, ocean, atmospheric and

space scientists come together and give serious thought on the satellite observations that anomalous changes are observed prior to earthquakes which remote sensing scientists claim. It is hoped that the future GEOSS mission will prove an important mission in providing early warning about natural hazards in general, and in particular about an earthquake.

1. Butler, D., *Nature*, 2005, **433**, 789.
2. Singh, R. P. and Ouzounov, D., *EOS Trans. AGU*, 2003, **84**, 244.

3. Singh, R. P. *et al.*, *Int. J. Remote Sensing*, 2002, **23**, 3123–3128.
4. Singh, R. P. *et al.*, Proceedings Symposium International 'En route to GODAE', 13–15 June 2002, Biarritz, France, 2002, pp. 369–370.

RAMESH P. SINGH

Department of Civil Engineering,
Indian Institute of Technology,
Kanpur 208 016, India
e-mail: ramesh@iitk.ac.in

Two Indian journals included in PCT Minimum List

Of the 144 journals from a meagre 13 countries, two Indian journals from CSIR, viz. *Indian Journal of Traditional Knowledge (IJTK)* and *Medicinal and Aromatic Plants*

Table 1. Country-wise periodicals included in PCT Minimum

Country	No. of Non-Patent Literature (NPL)
USA	85
UK	20
Germany	15
Russia	6
Japan	5
The Netherlands	3
India	2
France	2
Switzerland	2
Denmark	1
Czech Republic	1
Italy	1
Croatia	1
Total	144

Abstracts (MAPA) find place in the Non Patent Literature (NPL) part of the PCT (Patent Cooperation Treaty) Minimum Documentation of the World Intellectual Property Organization (WIPO). Specifically, more than half (85) of these journals/periodicals are from USA alone, India with two journals shares seventh position with France and Switzerland (Table 1)¹.

This development assumes a lot of significance as India has been recognized as the major owner and contributor of traditional knowledge in the world as also in the international patent system grant of a patent for an invention is based on three criteria, viz. novelty, non-obviousness and industrial applicability. Novelty is decided by the patent examiners, based on the past patents and non-patent literature. In fact, by filing one international patent application under the PCT, and designating any or all of the PCT Contracting States (126 PCT Contracting States as on 8 May 2005), one can simultaneously seek patent

protection for an invention in each of a large number of countries (India joined the PCT on 7 December 1998)².

1. National Institute of Science Communication and Information Resources (Council of Scientific and Industrial Research), Annual Report 2004–05, NISCAIR, New Delhi, 2005, pp. 1–2.
2. <http://www.wipo.int/pct/en/> as accessed on 14 June 2005.

N. C. JAIN

Division of Publication and Information,
Indian Council of Medical Research,
V. Ramalingaswami Bhawan,
Ansari Nagar,
New Delhi 110 029, India
e-mail: encejain@yahoo.co.in

Role of marine algae in organic farming

As rightly outlined by Ramesh *et al.*¹, the growing consciousness about environmental and health concerns has propelled global interest in the field of agriculture. In that article the concept of organic farming and its general characteristics have been comprehensively described. However, probable resources for organic farming have not been touched upon.

Resources for organic farming can be as varied as microorganisms, fungi, algae,

animals, etc. The nutrients in organic fertilizers are less likely to be leached out and are made available to the plants by a combination of favourable conditions like warm temperature, moisture and microbial activity. With proper management, organic farming could reduce or eliminate water pollution and help conserve water and soil on the farm. Organic farmers employ natural pest controls of biological origin and plants with pesticide properties instead of chemi-

cal-based fertilizers that cause detrimental effects on plants. Organic agriculture has been witnessing a gradual growth rate in countries like Germany, USA, Japan and France.

As the efforts to unearth new sources for organic farming accelerate, one needs to evaluate the options available. Marine algae popularly known as seaweeds, have served mankind from times immemorial. Historical evidences mention its use as manure on