

University) presented on hydrographic condition of the nearshore water off Honnavar and its environmental implications. Mr. Prasanna Kumar's (Bangalore University) paper was on change detection of the coastal wetland between the region of Honnavar and Bhatkal for environmental management using RS and GIS.

Session VII was devoted to Coastal Zone Management: Two papers were presented in this session. The first paper was on Miramar (Goa) beach management project: lessons learnt from a geological perspective by Dr. Antonio Mascarenhas (NIO, Goa) and second one was presented by Mr. C. P. Priju (CUSAT, Cochin) on coastal landforms changes in and around Cochin and their implications in Coastal Zone Management. In the concluding session, some recommendations were made based on papers presented and discussed in different technical sessions; concluding remarks of the Chairmen and Co-Chairmen of the technical sessions; and opinion of the experts who gave invited talks. Salient among these recommendations were:

1. Remote Sensing and GIS techniques have to be integrated for efficient coastal zone management (CZM).
2. For beach nourishment 'do nothing' or 'soft option' in place of 'hard structures' be popularized, and 'hard

option' is opted only to restore the places where cost is not the criteria.

3. Construction of seawalls be made based on cost benefit analysis.
4. More data on onshore and offshore be generated to reconstruct the sealevel curve for the Indian coast.
5. CRZ be implemented rationally and strictly.
6. Stake holders' participation in CZM is warranted and more participation of NGOs and scientific community be encouraged.
7. Imported technology for beach protection needs to be assessed from the points of view of efficiency and economics before implementation.
8. NITK (formerly KREC), Surathkal and Marine Geology Department, Mangalore University be made nodal agencies for monitoring coastal processes and protective measures of Udupi and Dakshina Kannada districts.
9. Collaboration among various institutions involved in coastal processes study be encouraged, facility be shared and data be integrated.

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BASIC AND APPLIED RESEARCH ON HYDROGEN AS THE NEW AGE FUEL

The U.S. Department of Energy has issued a *Grand Challenge* to the scientific community on research, development and demonstration of hydrogen storage materials and technologies. America is aiming to lead the world in developing clean, hydrogen-powered vehicles to place Hydrogen as the new age fuel for mankind as spelt out by the U.S. President in his State of the Union Address of January 2003. The announcement (*Physics Today*, August 2003, v.56, no.8, p.1) further states that:

Based on the recommendations from a group of expert "Think Tank" scientists, including four Nobel laureates, the Department of Energy (DOE) is issuing a *GRAND CHALLENGE* to the scientific community to solicit applications for research, development and demonstration of hydrogen storage materials and technologies.

In addition to applied R&D, a major focus will be on multidisciplinary basic research to better understand the physics of hydrogen storage in solid materials. The mechanisms of sorption, the presence of atomic or ionic hydrogen in the crystal lattice (or amorphous materials), and how defects and nano-scale effects can improve storage capacity – are just some of the issues to be studied. Cryogenic liquid storage and storage as a high pressure gas will also be investigated.

A total of \$150 million, subject to congressional appropriations, will be invested through the *Grand Challenge* over the next 5 years, covering a broad range of ideas, including metal hydrides, chemical hydrides, carbon, new materials, compressed and liquid hydrogen, and both on-board and off-board hydrogen storage technologies.

For more information on the above subject, readers may visit: <http://WWW.eere.energy.gov/hydrogenandfuelcells/>

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