

aspects of the adjoining area of mining. Following are some of the important recommendations of the workshop.

1. An integrated study for the Neendakara-Kayamkulam bar has to be taken up immediately since it contains rich buried placer deposits.
2. A detailed survey and characterisation of the paleobeaches in the shallow portion of the shelf are required for exploitation of the placers in future.
3. A comprehensive sand budget incorporating the various inputs and outputs of sand into/out of the nearshore is necessary to understand the annual erosion cycle and erosion caused by mining.
4. There is a need to identify a workable reserves for sustainable growth of the industry with least environmental impact.

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WORKSHOP ON APPLICATION OF FRACTALS IN EARTH SCIENCES

A workshop on Application of fractals in earth sciences was organised at National Geophysical Research Institute, Hyderabad during 22-26 September 1997. The workshop was sponsored by the Department of Science and Technology, Government of India, New Delhi.

The aim of the workshop was to introduce geoscientists to the concepts, methods and results obtained of fractal theory in earth sciences. Fractal is defined as a scale-invariant structure whose properties are unchanged under dilation or change of spatial length scale. The applications of fractals in earth sciences are many since many geological processes are scale-invariant. The frequency-size distribution of earthquakes, faults, rock fragmentation, volcanic eruptions, mineral deposits etc., follow the power laws. Islands, lakes, river networks, earth topography, ocean bathymetry etc., are some other examples.

In addition to the many areas of applications which were identified during the workshop following suggestion emerged from the deliberations

1. The power law can also be seen in various other branches of earthsciences such as in electromagnetic induction, generalized induction, petroleum studies, etc. The discrepancy reported in estimating the high conductivity of the crust by field investigations and that of low conductivity obtained in laboratory experiment has been attempted by electrical connectivity network model of percolation theory using fractal concept since conductivity also depends on the geometry of rock matrix. The different rock type yields different scaling exponents. The renormalization group method which has been applied in seismology and hydrology can also be applied to electrical connectivity model. The geophysical parameters exhibit anisotropy. The anisotropy in seismic or electromagnetic properties can be explained by random anisotropy models using network approach.
2. There should be more emphasis on concepts and mathematical approaches like fractals, chaos, self organized criticality and stochastic differential equations.
3. Professors from Mathematics and Physics departments of our universities should help scientists and researchers in other branches.
4. Scientists should work in other organizations for sometime to sharpen their minds.
5. Such courses should be organized once every two years and the duration of the course should be atleast for two weeks. The course should cover a wider area such as signal filtering, processing, inversion etc.
6. Knowledge will not grow unless there is a philosophical discussion among the group. Growth of science is not possible if one confines himself to one particular field.
7. There is a need for the formation of some working groups on fractals in the country.

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