

4. How are the coastal processes working in distribution of the eroded material in the adjoining basins? What is the pattern of mixing?
5. What is the quantity of water/sediment load that is transported and its seasonal variation?
6. Whether the escarpment has stabilized or does it have a tendency to rise further and at what rate?
7. What are the rates of chemical weathering, river incision and rates of erosion?
8. What are the ageing trends of this approximately 64 M year feature?
9. Is the concept of upwarp and rifting well established?
10. What are the effects of past climate changes on the evolution of this mega feature?
11. What are the major cause of gaps in the Western Ghats?
12. What is the subsurface structure of the Western Ghats?
13. What is the extension of the Indian Continental Crust?
14. When did the plate tilt?

To answer some of the above mentioned questions, at least partially, the experts opined that groups having diverse expertise such as the understanding and analysis of tectonics, deep continental structure, landscape evolution, geomorphology, geochronology, geochemistry, geobotany, climate/paleo-climate, oceanography and marine geology have to come together to design and execute projects on a co-ordinated mode in a timely manner.

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BOOK REVIEW

EARTH SYSTEM SCIENCE AND NATURAL RESOURCES MANAGEMENT: Silver Jubilee Compendium. G.R. Ravindra Kumar and N. Subhash (Editors), Centre for Earth Science Studies, Trivandrum, 2004, 453p.

The Silver Jubilee Compendium of the Centre for Earth Science Studies (CESS) highlights the major milestones crossed in the first twenty-five years of its existence. The late Prof. C. Karunakaran, former Director General of the prestigious Geological Survey of India, established the CESS in 1978 as the founder Director. He was a visionary who set the lofty goals of integrated research and development in the fields of geosciences, environmental science, marine science and atmospheric science, which form the core of today's Earth System Science.

The silver jubilee volume in well-designed hard cover begins with a Foreword by Prof. K.S. Valdiya, Chairman of CESS Research Council, commending the "academically exciting and socially relevant programmes" of CESS. The Editors present the road map of progress of CESS from its modest beginnings to the current status as an acclaimed national institute, through a well-chosen set of 28 articles. Dr. M. Baba, Director, traces the triumphant journey of CESS and provides a summary of articles in the volume. The printing, especially the photographs and coloured maps, is commendable, but some line drawings do not measure up to the standards. There is also a refreshing lack of editorial errors in the volume.

Palaeomagnetism of mafic dykes of south India is one of the major projects funded by the Dept. of Science and Technology, Govt. of India which also helped set up a palaeomagnetic laboratory in CESS. The first article by T. Radhakrishna and others on palaeomagnetism and dating of mafic dykes highlights the 1.65 Ga event as the most important, followed by 750-800 Ma alkaline dykes, 85-90 Ma dykes signifying separation of India-Seychelles from Madagascar by Marion plume and 70 Ma dykes related to Deccan volcanism. The authors also emphasize the role of subcontinental lithospheric mantle in dyke generation. M. Santosh describes Pan-African magmatism, role of CO₂ fluids from mantle in crustal evolution, and supercontinent development of Columbia and Gondwana with respect to the Kerala granulite terrain. G.R. Ravindra Kumar and S. Sukumaran show that the regional charnockites of Palghat Gap have formed by magmatic processes in deep crust, aided by pervasive flow of CO₂ fluids. In contrast, the arrested or patchy charnockites are thought to have developed on local scale by dehydration melting during exhumation or intrusion of younger granites. K.M.Nair and D. Padmalal describe the effects of transgressive-regressive cycles in South Kerala basin and relate its geomorphology to climatic

changes in the Quaternary. S. Chattopadhyay provides an overview of landforms in Kerala in relation to geomorphic processes.

Narayanaswamy deals with the economic potential of laterite-hosted gold in Nilambur. P.K. Omana and M. Santosh dwell on the genesis of high-purity gold in a weathering environment from Nilambur. D.S. Suresh Babu summarizes the properties of ilmenite placers and opines that the other heavies like zircon and monazite should be studied in detail for obtaining better market value for the placers.

Gravity surveys in the stations established by CESS indicate higher anomalies in Palghat Gap with respect to its surroundings, suggesting downwarping of the basement. Crustal thickness estimates vary between 33 to 37 km in the gap area. Results of magnetic surveys in the Humboldt region of East Antarctica are also presented (H.N. Singh and K.R. Unnikrishnan).

S.M. Das and others report the detection of inverse relationship between variation in atmospheric electrical conductivity and diurnal variation in atmospheric pressure. G. Mohan Kumar and S. Sampath establish strong linkage with vertical circulation, rainfall-associated ozone decrease in the day and ozone increase in the night, through a study of solar ultraviolet radiation.

Studies on coastal hydrodynamics in southwestern Kerala revealed notable deviations from the generally understood pattern of northerly currents during fair weather and southerly currents during the monsoon, which are attributable to eddy off the coast (N.P. Kurien and others). T.S. Shahul Hameed and others give the details of shallow water ocean wave modelling carried out by CESS. K.V.Thomas and others outline the work of CESS in generating wave data towards a proper coastal management. T.N. Prakash and others describe coastal erosion studies carried out by CESS in Lakshadweep with a view to evolving a better management plan. R.A. Varma and others outline a prognostic model of fresh ground water lenses in Lakshadweep for developing sustainable water resources. K. Soman and N. Chattopadhyay suggest measures for the sustainable use of the freshwater lakes of Sasthankotta and Vellayani.

P.P. Ouseph and G.M. Pillai present the results of coastal pollution studies carried out by CESS and emphasize the need for sewage treatment to stem the high incidence of pollution in the near shore waters. K.N. Babu and P.P. Ouseph study the effect of dredging for West Coast Canal on sediment quality. D. Padmalal and others deal with pollution from mining of sands, clay and lime from

Vembanad Lake and its catchment area, and suggest ways to overcome the problem and conserve the scarce natural resources.

V. Nandakumar opines from his study in Periyar Tiger Reserve that monoculture of eucalyptus adversely affects the forest ecosystem. C.N. Mohanan outlines the problems of biodiversity conservation with particular reference to the fragile ecosystems in Kerala. N. Sudhakar describes the technique of laser-induced fluorescence to study different aspects of vegetation stress, photosynthesis and air pollution. Terrain evaluation studies to plan road transportation network were carried out using remote sensing-geographic information system (M. Chattopadhyay).

Kusala Rajendran and C.P. Rajendran provide an analytical review of stable continental earthquakes (SCR) that have been severely rocking the Indian peninsula in recent times. They outline the details of research programmes in paleoseismology to better understand the SCR earthquakes. S. Chattopadhyay explains the concept of Panchayat resource mapping programme that is pioneered by CESS and is emulated by the Geological Survey of India in the North Eastern Region. The programme is essentially a participatory effort in land use planning that has achieved a modicum of success, which is laudable as a pioneering effort.

The wide coverage of various disciplines of Earth System Science in the volume gives a bird's eye view of the potential of CESS as a center of excellence. The scientists have been able to attract liberal funding for viable schemes from various agencies, which is a tribute to the inherent strength of the institution. The projects are focused on Kerala State as is natural for a State-funded institution. The programmes of CESS form an admirable blend of basic and utilitarian science, and have won praise from academicians and development planners alike. True to its motto of "Committed To Our Earth, Our Future", the CESS has blazed the trail for other institutions to emulate.

The CESS Silver Jubilee Compendium is not priced. CESS intends to make it available to all libraries of institutes and universities pursuing Earth Science Research as a complimentary copy. Libraries may send requests to the Director, CESS.

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