BOOK REVIEW

MARINE GEOLOGY – A SCENARIO AROUND INDIAN COASTS by T K Mallik. New Academic Publishers, 23, 4760/61, Ansari Road, Daryaganj, New Delhi – 110002; 457p.; 184 Price: Rs. 2,895.

This book is a compilation of information on the bottom topography, sediments, mineral resources and other aspects of the seas bordering the Indian sub-continent. It also includes details of the Deep Sea Drilling Project that was wound up several years ago and on the Law of the Sea Treaty.

It consists of 13 chapters followed by a list of references most of which are dated. Chapter I (Introduction) gives an account of the importance of the oceans, a historical overview of oceanographic studies conducted world-wide and in India, and organizations and institutions in the country that are engaged in marine geological activities, including teaching programs.

Chapter II (Nature of the Sea Floor Around Indian Coasts) provides a brief description of the various bathymetric features of the western and eastern continental margins and in the Carlsberg Ridge area.

Chapter III (Bottom Sediments Around Indian Coasts) includes details of the common litho-units encountered, and sediment distribution in the eastern and western continental margins. A section on the geochemistry of sediments refers to only a few of studies.

Chapter IV (Geotechnical Aspects of the Continental Shelves of India) is perhaps one of the few novel aspects of the book which provides an account of the geotechnical properties of sediments. These properties are important in the context of laying sub-marine pipelines, erecting offshore structures like oil drilling/production platforms, submarine landslides, sediment slump events etc. An overview of the geotechnical investigations concerning ports and harbours, entrance channels, offshore sediments etc is provided. Aspects of metal pollution in the marine domain are out of place in this chapter.

Chapter V (Exploration of the Sea Floor) describes the details and capabilities of Indian research vessels, position fixing methods and aspects of geological, geophysical and geochemical exploration of the sea floor. The old methods of position fixing could have been deleted and satellite navigation given in more detail. The main principle underlying satellite navigation – Doppler frequency shift – does not find any mention. The chapter does not even mention of global positioning system (GPS) which is used not only by marine scientists but also by other specialists and layman. Explaining the basic principles underlying the different samplers and methods and their merits and demerits would have enhanced the value of the book.

Chapter VI (Deep Sea Drilling Project) briefly explains the plate tectonics and sea-floor spreading theories, the DSDP and its scientific contributions, and DSDP in the Indian Ocean. The last aspect provides details of the sites, lithology, distribution of sediments of different ages, mineralogy, and the Bengal (Ganges) and Indus Cones. This is followed by only a brief mention of ODP and IODP. A book that is published in 2008 should have dealt more with the objectives, operations and contributions made by ODP and IODP rather than of DSDP.

Chapter VII (Mineral Resources of the Sea) discusses various aspects of terrigenous (placers), biogenous (calcareous sand), chemogenous (manganese nodules, phosphorite nodules, lime mud and barium nodules) deposits, minerals dissolved in sea water, miscellaneous deposits (sand, gravel and aggregates, deep sea ooze and hydrocarbons in the offshore) followed by mining of marine mineral deposits. There is no fixed format or framework in which the mineral deposits are presented and discussed. Whereas placer deposits are discussed in great detail (20 pages), offshore hydrocarbons are limited to one page. Some statements mislead readers who are new to the realm of geology and marine geology. For example, "…automatic replenishment of the deposit by natural processes…" (p.204); regarding placer deposits, "…alluvial type can be further divided into lacustrine, beach, offshore etc." (p. 205). The section on manganese nodules has several mistakes: "…were first discovered by HMS Challenger in 1876…"; "…two application areas where (were) identified by UNCLOS, 1984" (p.239); "In 1982 India was recognized as… a Pioneer Investor…".

Chemistry of nodules is restricted to three sentences and a table. The author brings in crusts (p. 245) which are a separate category of marine mineral deposits, notwithstanding their similarity with nodules. It would have helped readers if the chapter on the Law of the Sea (LOS) Treaty preceded that on marine resources of the sea, as LOS related terms in the nodules section may be

incomprehensible for readers. Strangely, the Red Sea metalliferous sediments are discussed under "Minerals dissolved in sea water". Even stranger is the "draft" convention of the Law of the Sea that came into force in 1994.

Chapter VIII (Coastal Zone Management) is almost entirely devoted to the CZM of Kerala. Suggestions are provided for model studies that should be undertaken in a coastal zone.

Chapter IX (Coastal Hazards) addresses hazards like cyclones and storm surges, coastal erosion, tsunami and case studies from Kerala and West Bengal. The December 26, 2004 tsunami is one of the up-to-date topics included in the book. While the author correctly points out that tidal wave is a misnomer for a tsunami, he uses it in brackets after the word tsunami (p.321). Although the tsunami warning system was operational in 2008 when the book was published, the author quotes a news report of 2005 that the system will be implemented in 2 ½ years time.

Chapter X (Coral Reef with Emphasis on Different Aspects of Lakshadweep) provides a general account of coral reefs, their morphology and distribution with special emphasis on Lakshadweep atolls, their form, general features, economic potential, geological and biological considerations etc. Page 341 says "…the reefs are perhaps not as fragile as was previously thought". The basis for this statement is not clear, particularly in view of the "very specific requirement for light, temperature, water clarity, salinity and oxygen" that the author himself has mentioned in the very next paragraph.

Chapter XI (Sea Level Changes Around Indian Coasts) gives an account of the factors responsible and lines of evidence for sea level variations, sea level curve, some related examples from the west and east coasts. It has left out Dwaraka/Bet Dwaraka and other marine archaeological surveys under the heading "Archaeological evidences". Paleoclimate and environment deserved to be dealt with in detail in a separate chapter; they are included as a sub-heading in this chapter. Some serious errors have crept in: the duration of Holocene is given as 0 – 0.015 million years, i.e. 15,000 years (Table 29); "The estimated rate of sea-level rise is of the order of 11.2 – 30 cm/yr (Barnett, 1983)" (p.382).

Chapter XII (Law of the Sea) summarises the historical development and the maritime zones recognized as per the United Nations Convention on the Law of the Sea, the International Seabed Authority etc.

The final chapter (Applications and Future Trends of Marine Researches) offers suggestions on various aspects of marine scientific research that needs to be carried out on the seas around India.

The author should be complimented for collating a large volume of information and data on the subject matter. It appears that the choice of material for the book was guided by, and mostly limited to, the investigations that the author was associated with and involved in during his long career. The book could have been written and presented better with neat illustrations and figures, and without spelling and grammatical mistakes (for example, mate the criteria; 4 x 10 to the power of 6 sq. km.; word wide use of phosphate; unrevealing the history; most promising and exiting directions; mare and more target areas; microboring organizations; storms that heat the east coast of India; geologists relay on a network …). The book would have been more useful if recent data were incorporated (data presented and discussed are from the 1980's and 1970's; > 60% of the references are from the pre-1990s), repetitions eliminated, some colour photographs included, and care taken to check the references cited with those listed at the end of the book. Sources for figures and tables could have been cited.

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