

BOOK REVIEW

AN OVERVIEW OF LITHO-BIO-CHRONO SEQUENCE STRATIGRAPHY AND SEA LEVEL CHANGES OF INDIAN SEDIMENTARY BASINS edited by D.S.N. Raju, James Peters, Ravi Shanker and Gopendra Kumar. Special Publication of the Association of Petroleum Geologists, Kaulagarh Road, Dehra Dun – 248 195, 2005, 210p., with numerous tables, charts and cross sections. Price not indicated.

Stratigraphy and palaeontology are fundamental to the reconstruction of past events and form an essential part of study in hydrocarbon exploration. The study of Precambrian, however, with its concentration of metals gained in importance to the somewhat neglect of stratigraphy. Most students of geology emerging from the colleges were not so well informed, about the happenings in the Quaternary era.

The importance to the study of Quaternary was realized especially when serious attention began to be directed towards hydrocarbon exploration. The narrow coastal belts along the east and west coast as well as the large spread of alluvium became targets of exploration. Such studies being mostly undertaken by commercial agencies, results of their systematic study was not easily available. Thanks to the dedicated work of D.S.N. Raju and others of ONGC we have now been able to get a clearer picture of the stratigraphic sequence of almost all the sedimentary basins of India in a single volume. The book, therefore, forms an important source book for a wide variety of stratigraphic information on matters relating to stratigraphy, palaeontology, palynology and sea level changes, all of which have become available to geologists for the first time.

The work of collation of a large volume of data accumulated over the years and presenting in a sequential form is a big task. D.S.N. Raju and his coworkers have carried out this work with care making it possible for all students of geology to reconstruct the complicated history of the geologically least known period, a study which has an important bearing on hydrocarbon exploration. The gratitude of the geological community should go to the Oil and Natural Gas Commission for releasing much of the classified information withheld over a long period.

The work carried out by the Association of Petroleum Geologists in bringing out this monumental study deserves the highest praise. We look forward to similar publications through its effort aimed at informing the larger community of geologists and kindling in them a spark for exploration, leading to fresh discoveries of oil and thereby contributing

to the economic prosperity of the nation. The book is appropriately dedicated to S.N. Talukdar and other geoscientists of the ONGC, the Geological Survey of India and other geoscientific organizations who led this exploration effort.

The authors are aware of the limitation in making the study more precise in the absence of accurate radiometric methods, the lack of palaeomagnetic data and information obtained from outside agencies.

A map at page 8 sets out the extent of the different sedimentary basins of India. An attempt has been made to categorize the basins into three major groups based on their oil production capability. The Cambay, Bombay offshore, Upper Assam, Krishna-Godavari form the Category I basins commercially producing oil; the partially and poorly explored Jaisalmer, Andaman, Bengal, Konkan-Kerala, Mahanadi in Shillong, and Brahmaputra basins forming Category II basins and the rest under Category III. A IV category, the geologically ancient basins like the Kaladgi, Bhima, Chattisgarh, Cuddapah is included.'

Detailed account of the general geology of the sedimentary basins of Central India, basins in the Dharwar and Bastar are given in a separate chapter. Stratigraphic tables and reference to literature are furnished by (CRRM Balu). Ravi Shanker, Gopendra Kumar and Murthy trace the palaeogeographic evolution of India and speculate on the hydrocarbon potential of basins concealed beneath the Gangetic plain, Deccan Trap and Rajasthan shelf. Presently exploration is confined to the Tertiary. Authors recommend serious attention to be given to Mesozoic and even Proterozoic sediments on the basis of analogies with Arizona, Australia and the Siberian platform.

D.S.N. Raju presents a review of major geological events which have left imprints in one or the other basins of India paying particular attention to marine transgressions, sea level differences and changes along the boundary.

One chapter is devoted to sequence stratigraphy in the Himalaya and reflections on Gondwana sedimentation. Significance of identifying supersequences in the time frame

of Gondwana has been attempted by Ravi Shanker and others. The nature of near shore sedimentation of the Gondwana basins of India is reviewed by S.K. Acharyya. O. N. Bhargava and others discuss the marine Triassic of the Himalaya. Kachchh along the west coast rightly has received special attention with Jai Krishna giving a summarized Intra-basinal perspective of ammonoid zonation. The promising hydrocarbon potential of this basin is yet to be fully established.

Biostratigraphy and paleoecology in the subsurface of Krishna-Godavari basin is presented by Raju and Ramesh. Depositional model for the delta of Tripura, another area awaiting exploration has been attempted by Mohanty and others. Recent advances in the stratigraphy of the Siwalik group is presented by Nanda and Sehgal. Carbonate sediments have so far proved to be the major reservoir rocks and D.S.N. Raju attempts at an overview of the palaeoenvironment of their formation.

One full chapter is devoted to hiatuses and changes in rates of sedimentation. Most of the oil in India has come from Tertiary sediments. Possibilities of discovering deep-sea oil in Cretaceous is reviewed by Raju and others. This is a field full of promise especially along the west and east coasts and is expected to be pursued with vigour in the coming years. The importance of recognizing the magnitude of hiatuses and sea-level changes across the K-T boundary in the east coast basins of Cauvery, Krishna-Godavari basin is another specialized field emphasized by Raju and others. This study is followed by the provision of

Tables and Notes giving details of Cretaceous and Cenozoic Biochron horizons which will prove useful in hydrocarbon exploration. A pictorial representation of sub-surface conditions would have added greatly to the value of the study.

All in all, the book is a valuable store of information on the stratigraphy of the sedimentary basins of India and is sure to be constantly referred to. The unwieldy size of the book however, makes it very difficult to handle. We wish the book had been reduced in size without sacrificing any of the details or the quality of illustrations. The want of subject index is a serious omission.

Having said this and discharged the obligation of a reviewer to be critical, we must reiterate our earlier estimate of the utility of this publication for all practitioners of Indian geology especially those interested in aspects of stratigraphy and palaeontology related to exploration of oil and set them thinking. We do trust the book will be followed by accounts of the producing oil fields and these will then form the stepping stones for the search of newer fields and identification of fresh horizons.

An epilogue at the end of the book, giving the author's own perception about exploration for oil in the coming years would have added to the usefulness of the book.

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