GEOLOGY OF RAJASTHAN (Northwest India) PRECAMBRIAN TO RECENT

by
A.B. Roy and S.R. Jakhar
Scientific Publishers (India), Jodhpur, 2002, 421p. Price Rs. 1900/-

Rajasthan has the unique distinction of possessing a well-preserved record of geological events that span from Early Archaean to Recent. It records early cratonisation events during the Archaean, development of orogenic belts, vast cratonic basins and voluminous outpouring/emplacement of igneous rocks during the Proterozoic, deposition of glacial debris during the Palaeozoic, imprints of separation of Indian continental landmass from Gondwana Supercontinent during the Mesozoic, volcanic eruptions during the Mesozoic-Cenozoic and sculpturing of major present day geomorphic features including the evolution of Thar desert and extinction of vedic river Saraswathi during the Quaternary period. All these events, particularly the ones during early part are so intricately inter-woven and in several key segments complexly overprinted that it becomes a real challenge for a geologist to unravel the mysteries of rock record with clarity. This challenge attracted the earth’s scientists for the past one hundred years and fructified in several landmark publications mainly from the officers of the Geological Survey of India (GSI) till later part of the last century and from then on both by Survey and scientist/academicians from other earth science institutions/universities. Despite impressive build-up of voluminous database and literature there are some controversies, mainly with regard to the stratigraphic position of the rock types that continue to nag the geological fraternity. The present book by an eminent and respected academician Prof. A.B. Roy and not a novice Dr. S.R. Jakhar presents the available database on Rajasthan rocks and discusses in detail the geology of the region. This comprehensive treatment, the authors claim, aims to address students, teachers, professional geologists and future researchers.

The authors have organized the material in twelve chapters that include six chapters on Precambrian geology of Rajasthan, three on Phanerozoic geology and three chapters are common to both the sections. Chapter one deals with the physical geology of the region, geomorphological details and information on drainage pattern. A short and succinct summary on geophysical studies of the region is provided in the second chapter. Geological framework of Rajasthan under two sub-heads, namely Precambrian geology and Phanerozoic stratigraphy is the subject matter of the third chapter. The nature, age, evolution and reconstitution of the basement rocks are the topics covered in the fourth chapter. The two chapters that follow presents most thorough treatment of almost all the geological aspects of the two Proterozoic fold belts namely Palaeoproterozoic Aravalli and Mesoproterozoic Delhi fold belts. Chapter seven outlines the lithostratigraphy, depositional environment and basin tectonics of the Meso-Neoproterozoic cratonic basins of Vindhyan Supergroup. Geology of western Rajasthan, described in chapter eight, provides fairly detailed account of Neoproterozoic magmatic suites (Abu-Seewariya granites and anorogenic felsic Malani magmatism) and cratonic basins (Sirohi Group and Marwar Supergroup). The next three chapters are devoted to Phanerozoic geology. The chapter nine deals with Palaeozoic-Mesozoic and Pre-Quaternary stratigraphy and provides a detailed account of events stratigraphy and tectonics of basin evolution. In chapter ten the authors have traced the history of magmatic events during Mesozoic-Cenozoic times. Chapter eleven provides detailed account of geologic evolution of Rajasthan during Quaternary period. This chapter deals with Quaternary lithostratigraphy, soils of Rajasthan, Quaternary palaeoclimatic conditions, lineament map patterns, manifestation of neotectonism in Rajasthan, evolution of saline lakes, drainage disorganisation and extinction of vedic Saraswathi during Quaternary period. The concluding chapter discusses the geological history of Rajasthan.

There are several points of strength in this book. These are: (i) detailed description of practically every major geological unit of Rajasthan (ii) it collates nearly ninety odd geological maps of critical areas at one place (iii) it lists about 900 references that facilitates a reader to reach the original reference with ease and (iv) it presents the text with absolute lucidity and bears the stamp of Prof. Roy’s inimitable style. In accomplishing this task they have drawn published material from all the sources including the Geological Survey of India. On the other hand, the weakest point of the book, explicit in chapters 2 to 7, is the excessive bias towards the views of Prof. Roy and his group and strong criticism of almost every piece of work other than the work of this group. Apparently, there is no scope for an alternate view to exist. The three major publications that came under scathing attack are Raja Rao et al. (1971, Rec. 101, GSI), Gupta et al. 1997 (Memoir 123, GSI) and a textbook by Sinha-Roy et al. (1996, published by the Geological Society of India). Notwithstanding the fact that a text-book designed to address students may not be the right medium to address
the controversies and debates and settle the scores, one
would find them in the book with renewed vigor. All the
other stratigraphic proposals (including those from
GSI and universities), according to the authors, are the result
of 'mis-reading of field relationship' or 'misunderstanding'
of certain settings, and that the work is 'based on
assumptions' (not on field geological maps/evidences) and
based on 'faulty stratigraphic premise' and that the conceived
stratigraphy by the other workers is actually 'upside down'.
In contrast, Roy and his groups work, the students are told,
is (always) based on 'detailed' mapping and they have
'confirmed' stratigraphic status to the rock types of the
region. They reject all the proposals because 'they suffer
from internal contradictions'. They reject well-entrenched
lithostratigraphic name of the basement to identify 'real'
basement, they generously allow certain names to be retained
because they are 'well known in the literature'. They
introduce new names 'to avoid confusion'. They avoid old
names because 'they cause confusion'. Such contradictions
are rampant in the section of the book that deals with
Precambrian rocks. In contrast, the chapters 8 to 11 that
cover Phanerozoic part deserves all round appreciation. The
rock record of this period is clear, so is the narration in this
part of the text book. In an outstanding effort of putting
oldest piece of information and the most recent ones together,
the authors have excelled in their endeavour. All those who
are concerned with this subject will enjoy this part of the
book with delight and pleasure.

The volume of the book could have been reduced if
many repetitions were avoided. Illustrative diagrams and
photographs have been used all through the text but the
quality of most diagrams is far from satisfactory and
some are of poor quality. The village names that are not
supported by the maps could have been avoided. Though
referencing is excellent in the book, one would find with
surprise that the unpublished work of Roy and his group
has got the weightage/preference over the well-quoted
papers on the same subject. The authors have even included
unpublished whole rock chemical data of Roy and his co-
workers that totals to 63% and 93%. The book has also
escaped a careful proof reading as exemplified by mis-
spelled words and mismatched captions of tables and
photographs.

The points of strength described above would score
over most (if not all) of the shortcomings of the book.
This comprehensive treatise on Rajasthan Geology should
find a place in the shelves of all earth science libraries. The
price tags would prohibit the students and researchers
alike to own their personal copy. During these hard times
of financial crunch faced by the pure science departments
in general and earth science department in particular, the
price tag may pose constraints for these departments also to
possess the book. But the information contained in the book
is much more worth than its price. The book is available in
the library of the Geological Society of India for reference
purposes.