

HISTORICAL GEOLOGY OF INDIA

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Published by

SCIENTIFIC PUBLISHERS (INDIA)

Jodhpur –

5 A, New Pali Road
P.O. Box 91
Jodhpur - 342 001 INDIA

Delhi –

● 4806/24, Ansari Road
Daryaganj
New Delhi - 110 002 INDIA

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ISBN: 978-93-86652-12-6

Visit the Scientific Publishers (India) website at
<http://www.scientificpub.com>

Printed in India

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PREFACE

History of the earth is a long saga dating back to more than four and a half billion years. The earlier part of its story is still misty and clouded with assumptions which are yet to be fully understood and explained. However, the later parts, notably the last billion years, are better documented, and we have fairly good idea of the happenings. This is mainly because the record of the remains of organisms is better preserved and throws a light on various aspects of the evolution of the earth's lithosphere and biosphere. The historical evolution is revealed through stratigraphic studies.

Stratigraphy is a rapidly expanding branch of Earth Sciences wherein the application of new and precise techniques is changing interpretations. Consequently, there is a greater potential of certain accepted principles being revised from time to time, and some of them becoming redundant. For the students of Earth Sciences, it is a challenge to remain abreast with the changing concepts and apply them for regional studies. The challenge becomes more difficult in the absence of text books, wherein the application of new principles to regional studies is included and the latest developments are recorded.

The students of Earth Sciences in India have been handicapped for need of up-to-date text books in stratigraphy and historical geology of India. For most of the 20th century, the main text books available were those by D. N. Wadia and M. S. Krishnan. The former became outdated by the 60s, while the latter was obsolete by the end of 70s. Since then, no serious effort has been made to bring out a text book which could replace them. The attempts made are either in the nature of general books on Indian geology which have little bearing to the curriculum of graduate and post-graduate studies or outdated because of some spurious data that found its way in them following a fossil scandal. Recently, the Geological Society of India brought out a book on the Geology of India in two volumes. This is an appreciable effort by the authors. These volumes could be of use for researchers. However, they cannot be used as text books as per the curriculum of various universities in India.

During my experience as a teacher of stratigraphy and regional geology of India spanning for nearly four decades, I have always found myself running a losing race. While the information of studies conducted in different regions of India was increasing, the same could not keep pace with the rapidly expanding concepts of stratigraphy. I realised alarmingly, that I did not know how to teach

the historical evolution of India from a stratigraphic perspective. One of the main handicaps was the absence of state-of-the-art text books. The students invariably resorted to outdated text books for writing their answers. They failed to relate classroom lectures to what was available in the text books and, therefore, preferred to depend on the latter. Some of the more resourceful ones who tried to consult other literature such as published papers also failed to separate grain from the chaff and would put in some subjective information of individual authors. Irrespective of what was given to them in class lectures and seminars, it was invariably the same story when they came to writing answers.

During my interactions with other teachers spread over the country, I found that all of them faced the same problem. In fact, it was reflected on national-level competitive examinations such as those of the Union Public Service Commission and other examinations conducted by government, semi-government and non-government organizations. The need to bring out a text book that would resolve this problem was immense.

Since stratigraphy is a dynamic science, it is necessary to be clear about the basic principles. While the enunciation of these principles is outside the scope of the present volume, a summarised version of the same has been included as the first chapter so that the students may not need to search for other sources to understand the broad applications.

One of the major problems related to regional stratigraphic studies is the explosion of formational names that has taken place during last few decades. While there is a code of nomenclature in operation, the subjectivity of these names is enormous, even where all nomenclatural rules have been followed. This is mainly because the principles of correlation are rarely followed. While theoretically all the names that are proposed as per code of nomenclature are valid, their use places a burden on students who have to put to memory an unnecessary plethora of oddly spelt and bizarre sounding place names. No wonder the subject is tending to become boring if too much emphasis is put on using these names. Objectively for a student it is not important to remember the sequential details but understand the implications on local, regional and global level in a time concept. Accordingly nomenclatural details have been included only where they are necessary.

While talking of formational names there is another problem related to it. Over the decades certain names have got deeply entrenched in literature and they are well understood. However, since code of nomenclature was proposed much later, some of these do not fit into it. Accordingly many attempts have been made to replace them without much success. A teacher is faced with a dilemma as to whether he should use the old name or the new one. Since it has not been possible to popularize the new name nor is there uniformity in its application, it is preferable to use the old name in an informal manner since it is well understood. In this volume the same practice has been followed.

The bibliography appended is not exhaustive and is only meant for students and research scholars to refer to some important source material in case they need the details on a particular subject. Generally those publications are listed that are of a review type or contain some original material that is relevant to the subject.

The standard stratigraphic scale included as Appendix I is based on Geological Time Scale as approved by the Commission of Stratigraphy of the International Union of Geological Sciences. It only covers the Phanerozoic part of the column since that is better understood and systematically correlated. The details of the Precambrian sequence are still sketchy and they are included in the main body of Chapter I.

The writing of this book has been a modest effort by somebody who claims to be a teacher but finds himself still a student. In spite of best efforts some inadequacies are bound to be there in this volume. All the teachers and students are requested to point out the same so that they can be rectified in future. Any other suggestions for the improvement of the book are welcome.

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August, 2017

