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The Andaman–Nicobar Accretionary Ridge

Geology, Tectonics and Hazards

Edited by P. C. Bandopadhyay and A. Carter



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The Andaman–Nicobar Accretionary Ridge: Geology, Tectonics and Hazards

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Preface

The 700 km long Andaman and Nicobar archipelago located in the northeastern part of the Indian Ocean is a region of strategic importance and historical significance. As the exposed part of the accretionary ridge that formed adjacent to the subduction zone separating the India-Australia plate from the over-riding Burma-Sunda plate it also has wide geological interest. The exposed rocks provide a condensed window into an active subduction zone that dates back to the Cretaceous. This Memoir (47), dedicated to the Andaman-Nicobar Archipelago, serves to connect the Geological Society Memoirs on Myanmar (45) and Sumatra (31) to provide a unique collection of studies on the Sunda subduction zone, one of the most seismically active regions on Earth.

The opening two chapters (by Bandopadhyay, and Bandopadhyay and Carter) of this 16 chapter volume document the history of mapping and research and introduce the geography and geomorphology of the 8249 km² of 552 islands and islets that belong to the Andaman – Nicobar chain. This is followed by chapters 3 to 5 that cover the regional geodynamic setting. Clift provides a discussion on the regional tectonic setting of the accretionary ridge and related research by the International Ocean Discovery Program (IODP). This is followed by a paper on Cenozoic rifting of the Andaman Sea (by Morley) that examines established and newly proposed models. In Chapter 5 Morley and Searle discuss the Cretaceous-Cenozoic development of the Sumatra-Andaman-Myanmar region and reflect on the outstanding regional issues. The next chapters detail the exposed rocks starting with an introduction to the stratigraphic framework in chapter 6 (by Bandopadhyay and Carter). Chapter 7 by Ghosh et al. is on the Andaman-Nicobar ophiolites. Chapters 8 and 9 by Bandopadhyay and Carter details the Paleogene stratigraphy, and in chapter 10 Limonta et al. examines the provenance of the Oligocene sandstones. Neogene rocks are reviewed in chapter 11 by Bandopadhyay and Carter. The Andaman Islands also include India's only active volcanoes associated with the inner arc and are discussed by Bandopadhyay in chapter 12. The next three chapters examine the neotectonics and hazards tragically brought to our attention by the December 26th 2004 earthquake and tsunami. In chapter 13 Singh and Moeremans report on the seismic reflection data that help define the structure of the whole Andaman-Nicobar subduction system which has importance for understanding the associated seismicity discussed in chapter 14 by Carter and

Bandopadhyay. Chapter 15 also by Carter and Bandopadhyay examines the impacts of the December 26th 2004 earthquake and tsunami across the Andaman-Nicobar archipelago. The volume concludes with chapter 16 on the economic geology (by Bandopadhyay, Ghosh and Carter) and evaluates the potential of various mineral resources including hydrocarbons.

We end this preface by thanking the contributors of this volume for their time and efforts and express our deep gratitude to the many reviewers. Our sincere gratitude is given to Rob Strachan for his time as handling editor, reviewer and advisor. Commissioning editor Angharad Hills is also thanked for her guidance, support and efficient and patient handling of the many queries. Special thanks also go to Tony Barber who provided valuable guidance on interpreting the geological features of accretionary rocks and for his constructive reviews of several chapters. P.C. Bandopadhyay is deeply indebted to Professors Dr Late Supriya Roy and Dr Pradip K. Bose of Jadavpur University for motivating him as a graduate student to pursue a career in geological research and is grateful to the Department of Science and Technology (DST), Govt of India for financial support in the form of a book writing project under the USERS scheme. Gratitude goes to the Geological Survey of India for attaching him to field season programmes on the Andaman Islands and the logistical support and co-operation provided by the Department of Geological Sciences, University of Calcutta, the Andaman-Nicobar administration, Coast-Guard, Indian Navy, and the Department of Forest and Environment at Port Blair, South Andaman. Dr Biswajit Ghosh, Dr Tapan Pal, Anindya Bhattacharyya, Dr. Wanjarwadkar, Tarun Koley and many others of the Geological Survey are thanked for their valuable support in the field. It would also be unfair not to mention Mrs Supriya Bandopadhyay and Miss Hiya Bandopadhyay for their enduring support and company in the field and Miss Sukanya Chaudhury, Technical Assistant of the book writing project, for computer drafting and Debaditya Bandyopadhyay and Soumi Chattopadhyay, for their help in technical matters during the preparation of the manuscript. The foundations of this work stem from NERC award NE/B503192/1 to Carter.

P.C. Bandopadhyay
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