Geological Evolution of the Red Sea

*by **Robert G. Coleman**, published on August 26, 1993, ISBN 0-19-507048-8, book price $59.95*

Review by **Christopher G. Kendall**

This slim volume is designed to provide a starting point for earth scientists interested in the geology if the Red Sea and for specialists who need a comprehensive survey of the Red Sea's geology. As Coleman recognized, it is difficult to synthesize the geology around and under of this sea since so many different countries border it but he has successfully managed to compile information from the various geological surveys, oceanographic studies, and the results of petroleum exploration for the Gulf of Suez and Red Sea.

The book is broken down into eight chapters. These deal with geomorphology, stratigraphy, volcanic history, age relationships, structure, geophysical outline, plate tectonics, and economic aspects of the geology of the Red Sea. The book begins with a brief introduction which explains the data sources that the author used and he lists his references at the back of the book, providing a good starting point for studies of the area for the first time.

The first chapter deals with geomorphology of the area, focusing on the shape of the Red Sea basin describing shelf segments of the Red Sea, the central trough and the occurrence of extensive subaerial lateral scarps both on the Saudi Arabian and western side of the Red Sea. There is a short description of the various islands found in the coastal waters and a very brief paragraph on the coral reefs.

The chapter on the stratigraphy encompasses the Precambrian through Quaternary sediments of the area, providing correlation charts for both the upper Cretaceous and Quaternary and describing the stratigraphy of the various volcanic episodes that the region has seen. Essentially the chapter shows that most of the sedimentary fill of the present Red Sea is related to the early Miocene development of the present Red Sea depositional basin. Prior to this Miocene event, Paleozoic and Mesozoic sedimentation trends show little evidence of the present linear structure of the Red Sea suggesting the stratigraphic relationships shown by the post-rift sediments do not support the existence of a Nubian Arabian dome prior to rifting. Coleman also indicates that the Miocene evaporite deposits of the Red Sea are a probably equivalent to those of Mediterranean Messinean, suggesting that the Mediterranean may have extended into the Red Sea at this time.

Next is the most comprehensive of the chapters in the book which deals with the volcanic history of the area. It catalogues the various volcanic events that occurred in the Red Sea area and illustrates these with a number of beautiful photographs, mostly taken in Saudi Arabia. The chapter also discusses the petrogenesis of some of lavas, illustrating their history with phase diagrams. The chapter ends with a very nice list of constraints provided by the history at these volcanic rocks, and is followed by a chapter on the age relationships of the volcanic events which occurred in the Red Sea.

Next is a chapter on Red Sea structure. This focuses on its different models for crustal extension in the area and the relationship of these models to various structural lineaments and trends which occur in the area. The author points out the Precambrian basement is highly metamorphosed and has been plastically deformed making it difficult to establish its stratigraphy, and the timing of faulting or folding, etc.

Next is a chapter describing the Geophysical data available for the area. This includes magnetic, gravity and seismic reflection character. Also featured are seismic refraction character, the seismic tomography of the Red Sea region, a discussion of heat flow and the existence of a plume in the Afar area. Each topic is illustrated by at least one map or cross-section showing, for instance, magnetic anomaly profiles with magnetic striping in the Red Sea, Bouguer gravity anomaly maps, and the use of seismic refraction to unravel the relationship between the crust and the mantle in the area. The problem here is that the hot mantel is so close to the surface that it is difficult to infer the existence of the different rock types etc.

Next is a chapter on Red Sea Plate Tectonics including the discussion of kinematics, early rifting, syn-rift events and sea-floor spreading. This is followed by a final chapter on economic aspects of the Red Sea including the discussion of hot brines and heavy metal deposits, potential for petroleum in the Gulf of Suez and around the margins of the Red Sea.

This book incorporates both ancient and modern geological data for the area, tending to provide an overview for the geology rather than representing a complete synthesis. It is very clear that the book is intended to be a source book for geological studies of the area rather than providing in-depth information about the different topics touched on by the author. Probably the best and most complete chapter in the book is that on the volcanic history of the area, representing, I believe, the focus of Bob Coleman's interests. This is a nice book to own, but may disappoint you if you are expecting a huge compendium. However it is an extremely useful book for those of you who have interest in the Red Sea, in the initial spreading history of the Red Sea, and the timing and emplacement of volcanics associated with this latter event.

This book is professionally put together, well illustrated and clearly written.

A geological period is one of the several subdivisions of geologic time enabling cross-referencing of rocks and geologic events from place to place. These periods form elements of a hierarchy of divisions into which geologists have split the Earth's history. Eons and eras are larger subdivisions than periods while periods themselves may be divided into epochs and ages. The rocks formed during a period belong to a stratigraphic unit called a system. Scottish Journal of Geology. Special Publications. Transactions of the Edinburgh Geological Society. Transactions of the Geological Society of Glasgow. Transactions of the Geological Society of London. User menu. My alerts. Log in. My Cart. Search. Search for this keyword. Advanced search. Geological Society of London Publications.Â The Nakasib suture is a late Proterozoic (Pan-African) ophiolite-decorated structural belt in the central Red Sea Hills of the Sudan. It represents one of the sutures along which the island arc/back-arc terranes and continental microplates of the Arabian-Nubian Shield are welded together. The Nakasib suture separates the 900â€“850 Ma old Haya terrane in the south from the 830â€“720 Ma old Gebeit terrane to the north.

RESEARCH COMMUNICATIONS. Geological evolution of Kachchh: an epitome of successive Phanerozoic events. A. B. Roy1,*, Alokesh Chatterjee2 and N. K. Chauhan3. 1Niloy Apartment, Flat 3/2G, 46A, R.N. Das Road, Kolkata 700 031, India 2Geology Department, Hooghly Mohsin College, Chinsura 712 101, India 31014 Hiran Magri, Sector 4, Udaipur 310 002, India.Â The geological records, however, recount a different history of the diverse depositional environment under diverse tectonic situa-tions. The earliest Phanerozoic event was the deposi-tion of Palaeozoic sediments during upper Permian and lower Triassic. Next event was a major marine incursion along rift zones coinciding with the Gond-wana break-up and the initiation of northward drift-ing of the â€˜Indian land massâ€™. In the southern Red Sea, the Sâ€reflection forms a surface at 300â€“800 mbsl that appears less disrupted. We suggest that the evaporites originally had a flat, horizontal surface at the end of the Miocene and have subsequently been distorted by isostatic effects and axial rifting, which in turn promoted evaporite flowage. Offâ€axis evaporite depressions correspond with flows identified with multibeam sonar. Furthermore, acrossâ€rift lows in Bouguer gravity anomalies represent valleys in the underlying basement.Â Bonatti, E., Colantoni, P., Della Vedova, B. & Taviani, M. (1984) Geology of the Red Sea transitional zone (22Â°Nâ€“25Â°N). Oceanol. Acta, 7, 385â€“398. [Google Scholar].