

DIMENSIONS OF HIMALAYAN GEOLOGY by A K BRYANI Satish
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'Dimensions of Himalayan Geology' seems to be an outcome of an overenthusiastic effort of the author. Spread over thirteen chapters, the author A K Bryani has tried to cover a vast array of topics related to the Himalaya. In the Introduction, he provides aspects of global and regional geographical framework of the Himalaya in addition to geological – tectonic classification. In subsequent two Chapters the author covers Indo-Gangetic Plain and Geomorphology of the Himalaya, briefly describing as much of the relevant aspects.

In the Structure and Tectonics Chapter Alpine fold belt and the Himalayan arc are referred in a general way. More specifically various tectonic features are discussed under the heading Longitudinal faults of Himalaya. It would have been more appropriate to refer these as major Himalayan Thrusts. The various thrusts broadly include the Siwalik intermittently thrusting over the Indo-Gangetic plain along the boundary between the Siwalik Belt and the Alluvial Belt. Other thrusts referred are the Main Boundary Thrust, Krol Thrust, Main Central Thrust, the so-called Tethyan Thrust and Indus Suture Thrust. Some of these terminologies have crept in without precise definitions or delineations on ground. However, the Tethyan Thrust seems to be another attempt to regionalize local tectonic features. The Zaskar Shear Zone, for whatever it conveys, is merely a feature of differential response of two contrasting litho-groups with diverse rheological properties. Similarly there is no terminology as Indus Suture Thrust. The Pashkum Thrust brings the Late Cretaceous to Palaeogene Sangeluma Group with ophiolitic mélange over the Neogene Indus Group, and it in turn is overridden by the Tethyan Sedimentary Belt. These thrusts have a SW to NE directional movement. Some of these aspects are not brought out in this chapter. Ground truth is a great casualty in Himalayan literature. Careful study of geological maps and literature is a prelude to any compilation. The author should have stated the subsurface crustal detachment on whatever available evidence without designating it as Main Himalayan Thrust. He briefly refers to features like salients and reentrants, transverse faults and lineaments. The Structures of Tectonic belts are separately referred with regard to Outer Himalaya, Lesser Himalaya, and Tethys Himalaya. After an introduction to the Nappes in the Himalaya specific reference to nappes in Pakistan and Indian Himalaya are made. Then again under the head of Sedimentary Nappe, Jaunsar, Garhwal, Berinag, Krol Nappes are discussed, and under Nappes of Tethyan

rocks Suture Zone Nappes, Jugbwa ultramafic Nappes are referred. The Indus Suture and Shyok Sutures are the two Himalayan Sutures referred. In quick succession the author navigates to Tectonic Windows and next hops to unconformities with fifteen supersequences followed by eastern and western syntaxial bends. The author next shifts to upheaval phases of deformation in the Himalaya and then to suspect terrane and neotectonics and the latter topic covers such diverse aspects as plate movement, major tectonic features, earthquake, uplift of the Himalaya, subsidence, stress direction, formation of structures, impact of neotectonics on topography. There is repetitive references to active tectonics and the author next moves on to experimental tectonics and lineaments and switches to Burmese arc and interface with Indian plate. The Chapter is further stretched to cover structure and tectonic interpretation followed by abnormal thickness of the crust in the Himalaya, genesis of domal structure, sedimentary basins and Himalayan Foreland Basin. Umpteen number of topics are jumbled together without logical linkage leading to virtual disorder in the presentation in this book.

Chapter 5 is devoted to Stratigraphy. After a brief introduction it opens with Indo-Gangetic Alluvial Plain, outer Himalaya within which the topics Proterozoic outer Himalayan carbonates, Kakara, Subathu, Murree Groups, and Siwalik Supergroup are discussed. The author next shifts to outer Nepal Himalaya and then brings in energy sequence, strataigraphy, magnetostratigraphy, rate of sedimentation, paleosols study in Siwaliks, Doon gravel. Somehow the sequence of topics is disconnected, a pattern which is seen throughout the book.

The section on Lesser Himalaya presents a tectonostratigraphic sequence. The author should have made better utilization of the contributions made by field geologists who have spent decades mapping the areas on which any stratigraphic sequence is to be based. Stratigraphy is presented more like an index to subject rather than a cogent description. The section on the Higher Himalaya covers various crystalline lithotectonic units in different sectors. It would have been better if the author had made a more detailed study of the published literature.

The Tethyan Himalaya covers the Phanerozoic Tethyan sedimentary belts in the Himachal-Uttaranchal, Kashmir-Chamba, Nepal, Eastern Himalaya. The Trans Himalaya includes the Indus Suture Zone, Shyok Suture Zone. It is described with inadequate literature coverage. Brief

references are made to tectono-stratigraphic set up of Kohistan region, Northern Suture, Karakoram block and Southern Tibet

Chapter 6 refers to Palaeontology with topics on fossiliferous horizons of Himalaya briefly mentioning the various fossiliferous formations from Proterozoic to Neogene. Various fossil forms are described alphabetically. Biozonation and palaeontology in tectonic interpretation are the other topics of this chapter.

The 7th chapter comprises topics on petrology in which the author deals with granites, and associated rocks, basic rocks, ophiolites, ultrabasic rocks, carbonatites, geochemistry, metamorphic rocks with their types, timing, deformation, metamorphic belts, inverted metamorphism and petrographic characteristics. In the section on sedimentary rocks cycles of sedimentation and basins of sedimentation are described.

In Chapter 8 the author refers to geochronology in which age data pertaining to igneous and sedimentary rocks and the age of metamorphism compiled from various sources are presented. Chapter 9 covers geophysical studies briefly referring to interior of the Himalaya, heat flow, earthquakes and seismicity, varying geomagnetic aspects, and GPS studies.

In the Environmental Geology (Chapter 10) natural and anthropogenic aspects of the problems are discussed. The natural hazards include soil erosion, river siltation, landslides, change in river course, glacial melting, heavy rains, cloud bursts, earthquake destruction, forest fires, loss of vegetation and other types of environmental damage. The author writes on "Social geology" which he considers as a medium for minimizing adverse impact of geological processes through proper education. He expresses that geology is largely ignored by society because the subject is not taught in schools despite the awesome aspects of geological processes like earthquakes, landslides and other disaster and a proper awareness would mitigate the same.

Geological Society of India has also focused on this aspect in several articles with an appeal for action from academics and education authorities.

Engineering Geology is presented in Chapter 11, in which the author refers to various engineering structures like dams, tunnels, bridges. In Chapter 12, resources of Himalaya are discussed. Mostly these are mineral occurrences. Excepting for limestone, magnesite and to some extent phosphorite and gypsum, and in a limited way salt, no other mineral is of any economic importance. This aspect should have been suitably brought out in the book. In the final 13th Chapter of this book the author discusses some of the aspects of origin and evolution of the Himalaya. The book contains a detailed bibliography.

A. K. Biriya has attempted to present a multidimensional aspect of the Himalaya. He has tried to pack his book with many topics, but the organization of subjects is rather haphazard. It has resulted in repetitions of topics which make a reader distracted. In his anxiety to cover every aspect of the Himalaya, there is telescoping of topics. The author should have provided the prefixing of the article 'the' for Himalaya. Although the book is targeted at university students, it may be somewhat confusing for them initially, and for researchers, it is too sketchy. However, the author is sincere in his objective of presenting the multi-dimensional aspect of the Himalayan Geology, and the book may provide as an introduction to uninitiated earth scientists and students entering the Himalayan arena. It would have been helpful to students if the book had included a glossary of various terms that appear in the text. The book could have included more geological maps. The author projects his social geology by stating briefly the ignorance about geology in the society, despite the fact it affects so many aspects of human lives which is largely true. Despite these shortcomings the book still serves some useful purpose.

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IGNEOUS PETROLOGY: 21st CENTURY PERSPECTIVE. Jyotsankar Ray and C. Bhattacharyya (Eds). Allied Publishers Pvt. Ltd., New Delhi, 2007, 234p.

The remarkable developments in the field of petrology, like in any other earth science disciplines, has resulted in new insights into the way rock melts are generated at different source regions, the mechanism through which the melts are brought to the sub-crustal levels and to the surface, crystallization processes and the way they change, in solid state, in response to the ambient pressure

temperature conditions during subsequent orogenic phases. The book under review attempts to outline the newer developments in igneous petrology through Indian examples. The book represents a proceeding volume of the workshop on the same subject held at the Department of Geology, Calcutta University in early part of 2005.

There are ten papers in this volume classified under six