

## BOOK REVIEW

**LAKES: WATER AND SEDIMENT GEOCHEMISTRY** by Brijraj K. Das; Satish  
Serial Publishing House, Delhi - 110 033. Price: Rs.1995, 2008, 215p.

Lakes are important water bodies formed both due to natural causes and human intervention and have significant societal importance. In this book Brijraj Krishna Das has presented the results of his decade long studies of lakes in parts of the Himalaya and Rajasthan particularly related to their water and sediment geochemistry in the background of natural processes in these lakes. The book is organized into eight chapters. The first three chapters are more introductory in nature and the rest provide details of the results of author's research work.

In the first chapter the author provides background information on the hydrological cycle from precipitation to various destinations of oceans, inland depressions and underground through tortuous routes. The second chapter deals with lake types with some examples from Himachal Pradesh and Uttarakhand. The third chapter deals with various physical processes that affect lakes with the objective of unfolding the dynamics of lake system. This provides a focus on thermal regimes in lake classification taking into consideration the density-temperature relationship of lake waters. The author discusses the complementary roles of photosynthesis and aerobic respiration in lake water. The presence or absence of nutrients determine the plant growth in lakes and accordingly the lakes are either oligotrophic or eutrophic. The Dal lake in Kashmir is a good example of eutrophic lake, whereas the lakes in Higher Himalaya with least human activity are oligotrophic.

Chapters four and five on weathering and water chemistry focuses on the data collected from the lakes of Jammu & Kashmir, Himachal Pradesh, Kumaun (Uttarakhand), Rajasthan and selected salt water (brackish water) lakes. The author describes the rain and snow-melt waters interaction with rock, its weathering products, soil and anthropogenic derivatives undergo modification in chemistry. Further, he expands on the aspects of mineral-specific weathering and their end products, as their interaction with water brings about significant changes in the composition of water that accumulates in a variety of depressions on earth's surface. He has highlighted specific chemical characteristics of a wide-ranging lakes as in Kashmir: Dal; Jammu: Mansar, Surinsar, Dankar; Himachal Pradesh: Spiti, Thinam and Gete, Sirmur- Renuka, Mandi-Rewalsar and Kuntibhayog, Chamba-Khajjiar; Uttarakhand:

Nainital, Bhimtal, Naukuchiyatal, Sattal; Rajasthan: Udaipur lakes - Fateh Sagar, Pichola, Udaisagar. The author has made specific study of important salt water lakes viz. Tsokar (Ladakh - J&K), Sambhar (Rajasthan) and also of Lonar crater lake (Maharashtra). This provides comprehensive information pertaining to geological setting and more importantly of the chemical characteristics of lake waters and the interpretation of their variable chemistry in relation to the lithology of the provenance area and in many cases to the anthropogenic interference. In most cases the solutes are derived from weathered rocks and in some cases from atmosphere also. The lake water chemistry provides a useful guide to the study of ecosystem of the surrounding areas.

The process of sediment chemistry and related examples are separately discussed in chapters six and seven. There are many aspects that have been considered in this study like the chemical breakdown of some minerals and formation of others. The author briefly discusses the chemical composition of sedimentary rocks, their mineralogical composition, hydrogen ion concentration, oxidation-reduction potential, colloidal processes, products of sedimentation and lake sediment chemistry, not leaving out the grain size, pore fluids, bioturbation, sedimentation rates, and various dating methods of these sediments. These are supported by examples from the lake sediments of Rewalsar, Renuka, Mansar, Dankar, Gete and Thinam.

The last chapter (eighth) is devoted to the biogeochemistry of lake sediments. It describes the role of organic content of lake sediments in biochemical and geochemical processes with specific examples from such lakes where detailed studies have been undertaken.

Lake water studies are generally carried out in India in the context of finding its potability. The present work by Brijraj Krishna Das is based on a more comprehensive limnological research. This work also brings out to some extent the role of environment and ecosystem. However, it could have been more specific as to have a focus. Our natural lakes and those created by anthropogenic interference need to be preserved free from pollution and encroachment and these aspects deserve equal importance. Today mankind is concerned with climate change and many natural lakes

contain signatures of changing climate in the past and present particularly in the Himalaya and future investigation of lakes should make this subject as part of any study on global climate change. The book contains a useful reference and index. It is a sincere attempt on the part of the author to bring out the results of his long research and the book is a

useful reference on limnology for students, environmentalists and research workers and should have a place in all libraries.

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