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Colin P. North and Kitty L. Milliken, Editors
A.J. (Tom) van Loon, Associate Editor for Book Reviews
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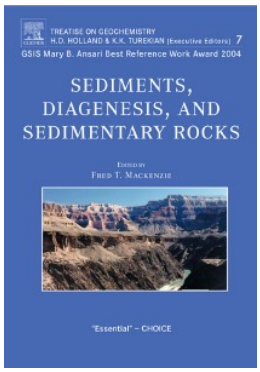

Sediments, Diagenesis, and Sedimentary Rocks, edited by F.T. Mackenzie, 2005. Treatise on Geochemistry, vol. 7. Elsevier, Customer Service Department, Linacre House, Jordan Hill, Oxford OX2 8DP, UK (Europe, Middle East and Africa). Elsevier, Customer Service Department, 11830 Westline Industrial Drive, St. Louis, MO 63146, U.S.A. (U.S.A. and Canada). Paperback, 446 pp. Price GBP 60.00. ISBN 0-08-044849-6.

Geochemistry is one of the core subjects of the geosciences and it has an important role in integrating various subdisciplines of geosciences into “Earth-System Science.” It is essential to understand the fundamental geochemical processes controlling the formation of sediments, their conversion into sedimentary rocks when reconstructing the temporal evolutionary history of the Earth’s exogenic system. Although documentation and handling geochemical data has long been part of the study of sedimentation processes, it was only after World War II that the development and application of geochemical methods relevant to the sedimentological problems started to flourish.

The majority of sedimentology and sedimentary petrology books (excluding those on carbonate sedimentology and a few special volumes for advanced graduates and researchers) deal, however, primarily with the physical aspects of sedimentation, while the geochemistry of sediments and sedimentary rocks received little attention of the authors. A few pages or—at best—one or two short chapters are commonly devoted to the origin of sediments and their measurable properties such as their mineralogy, chemistry, and isotopic compositions of organic and inorganic phases. Palaeoenvironmental reconstruction is often hindered by the loss of information as the sediments pass through diagenetic processes, but these processes—and particularly those in siliciclastic sediments—are often underscored!

This book will fill in the need of students, researchers and practice-oriented professionals who require geochemistry for effective understanding of chemical aspects of sedimentation. The book is part of Elsevier’s series ‘Treatise on Geochemistry’ and has been dedicated to the late Prof. Robert M. Garrels in recognition of his contributions to our understanding of geochemical processes that govern the formation of sediments and sedimentary rocks.

The book is subdivided in fifteen chapters. The first few chapters (Chapters 1–4) deal with the geochemistry of recent siliciclastic and carbonate sediments, and their diagenesis. Precambrian cherts differ significantly from their Phanerozoic counterparts in terms of their mode of formation. Some early Precambrian cherts bear evidence of ancient life. For obvious reasons, a separate chapter (Chapter 5) has been devoted to the formation and diagenesis of Precambrian cherts. The geochemistry of fine-grained sediments and sedimentary rocks (with some geochemical case studies from both recent and ancient sediments, with a separate section on recent advancements in the analysis of Precambrian rocks) are discussed in the next chapter (chapter 6), together with the late diagenesis and mass transfer in sandstone/shale successions (chapter 7); the framework for observations dealing with small-scale and large-scale elemental mobility during the late diagenesis of siliciclastic rocks is also summarized in chapter 7.

Then follow five chapters devoted to the geochemistry of organic-rich material in coal, oil, gas, sulphur, manganese bearing sediments, rocks, and ores and green clay minerals (Chapters 8–12). The final three chapters (Chapters 13–15) discuss the chronological aspects of sediments and sedimentary rocks and the role of isotopic and biogeochemical proxies encoded within them to interpret the evolution of earth-surface processes and the environment.

This is a well planned and well organised book with up-to date references, and with excellent photos and graphic illustrations. The individual chapters are written by active researchers and experts who are well known in their respective field of research. The result consists of critical and in-depth reviews/overviews of the present state-of-the-art. For example, it is commonly believed that late diagenesis of siliciclastic sediments involve only compaction and dewatering of sediments. After reading Chapter 7, it becomes clear, however, that this not so simple and that "the magnitude of mineralogical changes in late diagenesis is large and these changes have important implications for understanding rates and mechanisms of element cycling through the crust." The editor has assembled the chapters on a wide range of topics in a nice manner, and the content and presentations are well balanced. I sincerely believe that the book will be appreciated by students, researchers and professionals alike. And it will certainly be a welcome addition to the libraries of academic institutes, although it is somewhat expensive.

Rajat Mazumder
Department of Earth and Environmental Sciences
Munich University
Luisenstrasse 37
D-80333 Munich
Germany
E-mail: mrajat2003@yahoo.com

SEPM—The Society for Sedimentary Geology