

sedimentary petrology by pettijohn

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Sedimentary Rocks

This book is the outgrowth of a week-long conference on sandstone organized by the authors, first held at Banff, Alberta, in 1964 under the auspices of the Alberta Association of Petroleum Geologists and the University of Alberta, and again, in 1965, at Bloomington, Indiana, under the sponsorship of the Indiana Geological Survey and the Department of Geology, Indiana University. A 2- page syllabus was prepared for the second conference and published by the Indiana Geological Survey. Continuing interest in and demand for the syllabus prompted us to update and expand its contents. The result is this book. We hope this work will be useful as a text or supplementary text for advanced undergraduate and graduate courses in sedimentation, sedimentary petrology, or general petrology and perhaps will be helpful to the teachers of such courses. Though we have focussed on sandstones we have necessarily included much of interest to students of all sediments. We hope also that it will be a useful reference work for the professional geologist, especially those concerned with petroleum, ground-water, and economic geology either in industry or government. Because the subject is so closely tied to surface processes it may also be of interest to geo morphologists and engineers who deal with beaches and rivers where sand is in transit.

Sand and Sandstone

Originally published in 1992, Petrology of Sedimentary Rocks is now back in print and available. In Petrology of Sedimentary Rocks, Dr. Sam Boggs wrote what has come to be considered the definitive text on the subject of sedimentary petrology. The book is intended for students at the senior and graduate level. The text provides a comprehensive description, classification and interpretation of all major sedimentary rock groups. The essential aspects of diagenesis, particle and chemical composition, and provenance receive unparalleled coverage. Photographs, line drawings and tables are utilized to enhance understanding and illustrate sedimentary structures, textures and compositions. A clear, fluid writing style distills the vast amount of information contained in the text, and presentation of controversial topics provides students with insight into divergent views and opinions. Prior to receiving his Ph.D. in geology from the University of Colorado in 1964, Sam Boggs worked as a petroleum exploration geologist for the Phillips Petroleum Company. On completion of his doctorate, Dr. Boggs conducted research for Esso Production Research, applying geological and geophysical techniques to interpret the stratigraphic characteristics of sedimentary sequences and stratigraphic controls on oil accumulation in major U.S. basins. During his career, Dr. Boggs, has authored many papers in sedimentary petrology, geological oceanography, stratigraphy and organic geochemistry.

Evolving Concepts in Sedimentology

In the past, interest in sedimentary structures has arisen mainly from the expectation that these features might be a guide to the environment of deposition. But many sedimentary structures have also proved useful in determining stratigraphic order in nonfossiliferous, steeply inclined beds especially in Precambrian terranes. As the sequence problem has been reviewed at length by Shrock, it seemed to us,

therefore, that the time is now ripe for a new look at sedimentary structures, not with respect to "top and bottom," but with reference to "fore and aft. " Much of the present-day interest in these structures stems from their usefulness in mapping of paleocurrents. A stage has been reached where there is need for a work which assembles, digests, and organizes our collective knowledge of the usefulness of directional properties of sediments and their application to basin analysis. This we have attempted to write. The desirability and need for such a book occurred to both of us independently. Upon discovering our mutual interest, we decided that a better book could be written by collaboration. Fortunately this collaboration became a reality because of support by the Guggenheim Foundation of one of us and the cooperation and support of The Johns Hopkins University of both of us. We acknowledge with thanks this indispensable aid.

Petrology of Sedimentary Rocks

Inadequate observation of sedimentary TRUSHKovA and KUKHARENKO'S "Atlas of structures has been responsible for incorrect Placer Minerals." The most comprehensive interpretation of the order of superposition atlas is the "Atlas of Textures and Struc in deformed beds and this has led, in turn, tures of Sedimentary Rocks" edited by A. to gross errors in stratigraphy and structure. V. KHABAKOV (1962). Failure to recognize and utilize those Our Atlas is an outgrowth of our work on structures which indicate direction of cur "Paleocurrents and Basin Analysis," a book rent flow has also led to incorrect, or at in which directional sedimentary structures least incomplete, understanding of basin are described and interpreted with special development. reference to the evolution of sedimentary We believe, therefore, that there is need for basins. That work, however, contains mini a work which constitutes a field guide to the mal photographic material - just enough study of these structures - a book in to give the reader some concept of the sedi which these structures, so difficult to mentary structures described.

Paleocurrents and Basin Analysis

Scholarly work on sedimentology. Each article is signed and has a bibliography. Illustrated. Indexed.

Manual of Sedimentary Petrography

This textbook outlines the physical, chemical, and biologic properties of the major sedimentary rocks, as revealed by petrographic microscopy, geochemical techniques, and field study. It covers the mineralogy, chemistry, textures, and sedimentary structures that characterise sedimentary rocks, and relates these features to the depositional origin of the rocks and their subsequent alteration by diagenetic processes during burial. In addition to detailed sections on siliciclastic and carbonate rocks, it also discusses evaporites, cherts, iron-rich sedimentary rocks, phosphorites, and carbonaceous sedimentary rocks such as oil shales. This second edition maintains the comprehensive treatment of sedimentary petrography and petrology provided in the first edition, and has been updated with new concepts and cutting-edge techniques like cathodoluminescence imaging of sedimentary rocks and backscattered electron microscopy. It is ideal for advanced undergraduate and graduate courses in sedimentary petrology, and is a key reference for researchers and professional petroleum geoscientists.

Atlas and Glossary of Primary Sedimentary Structures

The study of sediments is concerned with (1) the physical conditions of deposition of a sediment, whether glacial, fluvial marine, etc.; (2) the time of formation or age of the de posit; and (3) the provenance, or area of denudation that furnished the material composing the sediment. All of the analytical methods described in this volume have as their common aim the elucidation of these points.

Encyclopedia of Sedimentology

A concise account of all major branches of sedimentary geology, highlighting the connecting links between them. Introduction; Processes of sedimentation; Sedimentary texture; Sedimentary petrology; Hydraulics, sediment transportation and structures of mechanical origin; Sedimentary environments and facies; Tectonics and sedimentation; Stratigraphy and sedimentation; Basin analysis: A synthesis; References; Index.

Petrology of Sedimentary Rocks

With more than 192 full-color illustrations, this atlas permits virtually first-hand observations through a petrographic microscope of the most important and representative classes of sedimentary rock. Nine

major sedimentary rock groups, such as sandstones, rudaceous rock, argillaceous rock, volcanoclastic rock, dolomites, siliceous rock, phosphorites, ironstones, and evaporites. An indispensable reference for professional geologists and undergraduate and graduate students enrolled in sedimentary petrology or petrography courses.

Procedures in Sedimentary Petrology

This book is written for the student new to the subject as well as for the experienced geologist whose work leads him to the study of sedimentary basins.

Manual of Sedimentary Petrography

Sedimentology is steadily developing as a basic discipline of earth sciences. The authors describe the chronology of the emergence of sedimentology by setting out the objective of sedimentology studies and its broad impact on such diverse fields of earth sciences as petrology, mineralogy and geomorphology, as well as on applied fields such as geotechnology, ecology and soil sciences. The approach is distinctive since the book deals with the significant contributions made by individuals to the development of the subject from Steno in the 17th-century to the present day. As a library reference work, *The Evolution of Clastic Sedimentology* is lavishly illustrated with examples of the authors' research and includes portraits of key scientists. The book is a revised and expanded version of a book first published in Japanese in 2002.

Introduction to Sedimentology

In the extensive field of earth sciences, with its many subdisciplines, the transfer of knowledge is primarily established via personal communication, during meetings, by reading journal articles, or by consulting books. Because more information is available than can be assimilated, it is necessary for the individual to search selectively. Books take more time from the inception of an idea until publication than any of the other means of communication mentioned. As a consequence, their function is somewhat different. Many good books are a compilation of up to date knowledge and serve as reference or instruction manuals. Some books are a collection of previously published papers dealing with a certain topic, while others may basically provide large sets of data or examples. The *Frontiers in Sedimentary Geology* series was established both for students and practicing earth scientists who wish to either stay abreast of the most recent ideas or developments or to become familiar with an important topic in the field of sedimentary geology. The series attempts to deal with subjects that are in the forefront of both scientific and economic interest. The treatment of a subject in an individual volume should be a combination of topical, regional, and interdisciplinary approaches. Although these three terms can be defined separately, in reality they should flow into each other. A topical treatment should relate to a major category of sedimentary geology.

Sedimentary Rocks, 3e

This book is designed for a one-semester course in sedimentology taken by advanced undergraduate or graduate students. It gives detailed descriptions of sedimentary features and the analytical methods used to evaluate them and is intended to support and reinforce principles presented in lectures. Discussion of principles and processes is found in complementary texts, such as Leeder's (1982) *Sedimentology: process and product* and selected readings in professional journals. This book is not an exhaustive treatise of laboratory techniques and theory. The subject matter includes topics generally covered in courses entitled "Sedimentology" or "Sedimentation". Sandstone and carbonate petrography is commonly given in a separate course. Furthermore, this topic is covered in several current texts. For these reasons I have omitted petrographic methods, with the exception of those applying to heavy minerals. I have included a rather extensive discussion of heavies because this topic is generally lacking in most modern texts. Every course in sedimentology is highly individualistic and material covered varies with the interests, background, and point of view of the instructor. For these reasons some topics presented in this book are not necessarily covered in all courses. Similarly some instructors may find that their favorite topic is missing. I can only hope that this problem is minimal. Several chapters contain precise exercises to be completed by the student. Some must be done in the classroom, where specimens are available for study. Others may be done outside of the classroom.

Petrology of Sedimentary Rocks

The first edition appeared fourteen years ago. Since then there have been significant advances in our science that warrant an updating and revision of Sand and Sandstone. The main framework of the first edition has been retained so that the reader can begin with the mineralogy and textural properties of sands and sandstones, progress through their organization and classification and their study as a body of rock, to consideration of their origin-provenance, transportation, deposition, and lithification-and finally to their place in the stratigraphic column and the basin. The last decade has seen the rise of facies analysis based on a closer look at the stratigraphic record and the recognition of characteristic bedding sequences that are the signatures of some geologic process-such as a prograding shallow-water delta or the migration of a point bar on an alluvial floodplain. The environment of sand deposition is more closely determined by its place in such depositional systems than by criteria based on textural characteristics-the "fingerprint" approach. Our revision reflects this change in thinking. As in the geological sciences as a whole, the concept of plate tectonics has required a rethinking of our older ideas about the origin and accumulation of sediments-especially the nature of the sedimentary basins.

Sedimentary Petrography

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