

# *Carbonates Sedimentology Geographical Distrtion And Economic Importance Geology And Mineralogy Research Developments Chemical Engineering Methods And Technoogy*

*This textbook provides an overview of the origin and preservation of carbonate sedimentary rocks. The focus is on limestones and dolostones and the sediments from which they are derived. The approach is general and universal and draws heavily on fundamental discoveries, arresting interpretations, and keystone syntheses that have been developed over the last five decades. The book is designed as a teaching tool for upper level undergraduate classes, a fundamental reference for graduate and research students, and a scholarly source of information for practicing professionals whose expertise lies outside this specialty. The approach is rigorous, with every chapter being designed as a separate lecture on a specific topic that is encased within a larger scheme. The text is profusely illustrated with all colour diagrams and images of rocks, subsurface cores, thin sections, modern sediments, and underwater seascapes. Additional resources for this book can be found at: [www.wiley.com/go/james/carbonaterocks](http://www.wiley.com/go/james/carbonaterocks)*

*Hardcover plus DVD*

*Modern seismic data have become an essential toolkit for studying carbonate platforms and reservoirs in impressive detail. Whilst driven primarily by oil and gas exploration and development, data sharing and collaboration are delivering fundamental geological knowledge on carbonate systems, revealing platform geomorphologies and how their evolution on millennial time scales, as well as kilometric length scales, was forced by long-term eustatic, oceanographic or tectonic factors. Quantitative interrogation of modern seismic attributes in carbonate reservoirs permits flow units and barriers arising from depositional and diagenetic processes to be imaged and extrapolated between wells. This volume reviews the variety of carbonate platform and reservoir characteristics that can be interpreted from modern seismic data, illustrating the benefits of creative interaction between geophysical and carbonate geological experts at all stages of a seismic campaign. Papers cover carbonate exploration, including the uniquely challenging South Atlantic pre-salt reservoirs, seismic modelling of carbonates, and seismic indicators of fluid flow and diagenesis.*

*Carbonate Sedimentology and Petrology*

*Seismic Characterization of Carbonate Platforms and Reservoirs*

*Environmental Sedimentology*

*Microbial Carbonates in Space and Time:*

## ***Southern Australia***

### ***Geology of Carbonate Reservoirs***

Microbial carbonates (microbialites) are remarkable sedimentary deposits because they have the longest geological range of any type of biogenic limestones, they form in the greatest range of different sedimentary environments, they oxygenated the Earth's atmosphere, and they produce and store large volumes of hydrocarbons. This Special Publication provides significant contributions at a pivotal time in our understanding of microbial carbonates, when their economic importance has become established and the results of many research programmes are coming to fruition. It is the first book to focus on the economic aspects of microbialites and in particular the giant pre-salt discoveries offshore Brazil. In addition it contains papers on the processes involved in formation of both modern and ancient microbialites and the diversity of style in microbial carbonate buildups, structures and fabrics in both marine and non-marine settings and throughout the geological record.

Reservoir quality is studied using a wide range of similar techniques in both sandstones and carbonates. Sandstone and carbonate reservoir quality both benefit from the study of modern analogues and experiments, but modelling approaches are currently quite different for these two types of reservoirs. There are many common controls on sandstone and carbonate reservoir quality, but also distinct differences due primarily to mineralogy. Numerous controversies remain including the question of oil inhibition, the key control on pressure solution and geochemical flux of material to or from reservoirs. This collection of papers contains case-study-based examples of

sandstone and carbonate reservoir quality prediction as well as modern analogue, outcrop analogue, modelling and advanced analytical approaches.

Carbonate rocks (limestones and dolomites) constitute a major part of the geological column and contain not only 60% of the world's known hydrocarbons but also host extensive mineral deposits. This book represents the first major review of carbonate sedimentology since the mid 1970's. It is aimed at the advanced undergraduate -postgraduate level and will also be of major interest to geologists working in the oil industry. Carbonate Sedimentology is designed to take the reader from the basic aspects of limestone recognition and classification through to an appreciation of the most recent developments such as large scale facies modelling and isotope geochemistry. Novel aspects of the book include a detailed review of carbonate mineralogy, non-marine carbonate depositional environments and an in-depth look at carbonate deposition and diagenesis through geologic time. In addition, the reviews of individual depositional systems stress a process-based approach rather than one centered on simple comparative sedimentology. The unique quality of this book is that it contains integrated reviews of carbonate sedimentology and diagenesis, within one volume.

Analysis, Modelling and Prediction

The Great American Carbonate Bank

From Sedimentary Environments to Rock Physics

Analysis, Interpretation and Application

Oceanography: an Earth Science Perspective

## Paleoenvironmental Record and Applications of Calcretes and Palustrine Carbonates

*This unparalleled reference synthesizes the methods used in microfacies analysis and details the potential of microfacies in evaluating depositional environments and diagenetic history, and, in particular, the application of microfacies data in the study of carbonate hydrocarbon reservoirs and the provenance of archaeological materials. Nearly 230 instructive plates (30 in color) showing thin-section photographs with detailed explanations form a central part of the content. Helpful teaching-learning aids include detailed captions for hundreds of microphotographs, boxed summaries of technical terms, many case studies, guidelines for the determination and evaluation of microfacies criteria, for enclosed CD with 14000 references, self-testing exercises for recognition and characterization skills, and more*

*"This volume covers many of the important advances in the geological sciences from 1963 to 2013. These advances include understanding plate tectonics, exploration of the Moon and Mars, development of new computing and analytical technologies, understanding of the role of microbiology in geologic processes, and many others"--Provided by publisher.*

*The past decade has witnessed a major revival in attempts to separate biodiversity signals from biases imposed by sampling and the architecture of the rock record. How large a problem this poses to our understanding of biodiversity patterns remains debatable, and new approaches are being developed to investigate this question. Here palaeobiologists with widely differing approaches and interests explore the problems of extracting reliable information on biodiversity change from an imperfect geological record. Topics covered range from the application of information-theoretic approaches that identify directional causal relationships to an in-depth study of how geological biases could influence our understanding of dinosaur*

*evolution.*

*A Color Guide to the Petrography of Carbonate Rocks*

*Petroleum Geoscience*

*Evolution of the Levant Margin and Western Arabia Platform Since the Mesozoic*

*Origin of Carbonate Sedimentary Rocks*

*U.S. Geological Survey Professional Paper*

*Cool-water Carbonates*

During the past decade, work on cool-water carbonates has expanded to become a mainstream research area. Studies on modern and Quaternary deposits will continue to be important; however, there is increasing momentum towards unravelling sediment processes, biota-sediment interactions and diagenetic products in Cenozoic and older cool-water carbonates. Many contributions in this book document Cenozoic and Quaternary carbonates from landlocked (microtidal) water-bodies. These carbonates display important differences in biota and fabric distributions when compared with world ocean examples. Consequently, the scientific community is now better placed to reinterpret pre-Tertiary carbonates where there is a suspicion that they have developed under microtidal conditions. Some papers in the book provide new approaches to interpreting environmental change within macrotidal regimes and others lay firm foundations for future cool-water carbonate diagenetic research. The aim of the book is to illustrate recent international contributions to cool-water carbonates

research, with an emphasis on Neogene and Recent case studies. Contributions are divided into three sections: microtidal carbonates from the Mediterranean realm; macrotidal examples from New Zealand, Australia and Mexico; and early diagenetic fabrics.

This comprehensive textbook presents an overview of petroleum geoscience for geologists active in the petroleum industry, while also offering a useful guide for students interested in environmental geology, engineering geology and other aspects of sedimentary geology. In this second edition, new chapters have been added and others expanded, covering geophysical methods in general and electromagnetic exploration methods in particular, as well as reservoir modeling and production, unconventional resources and practical petroleum exploration.

In this text, the authors present current research in the study of the sedimentology, geographical distribution and economic importance of carbonates. The topics discussed in this compilation include the alternative procedures for the synthesis of linear carbonates from alcohol and carbon dioxide; functional polymers based on carbonates obtained from CO<sub>2</sub>; an experiment using soil micromorphology and image analysis for physical redistribution of calcium carbonate in soil pore systems; and the types of petroleum reservoirs in carbonate sediments of the Russian Basin.

Foundations in Carbonate Soils

## Advances in Carbonate Exploration and Reservoir Analysis

The Web of Geological Sciences

Carbonate Systems During the Oligocene-Miocene Climatic Transition

Reservoir Quality of Clastic and Carbonate Rocks

Geological Survey Professional Paper

"This volume presents current understanding of the mechanisms and environments of the formation of calcretes and palustrine carbonates. Through a series of specific field examples, papers in this volume illustrate the wide variety of potential applications of these types of deposits. The papers presented here cover a wide array of ages and environmental settings of calcrete and palustrine deposition and include many interesting applications, such as the climatic and geomorphic controls on calcrete formation, possible modern analogues for palustrine carbonates, the interplay between palustrine, pedogenic, and diagenetic processes, the utility of radio-isotopic methods for dating pedogenic carbonates, applications to understanding landscape evolution, and reconstruction of diagenetic sequences. The result is a state-of-the-art book on these deposits so common in the geological record and in recent environments."--Publisher's website.

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calcium carbonate in soil pore systems; and the types of petroleum reservoirs in carbonate sediments of the Russian Basin.

Environmental Sedimentology provides a comprehensive introduction to this rapidly expanding field which addresses the functioning and dynamics of contemporary sediment systems and how these systems respond to a range of both natural and anthropogenically-induced disturbance events. considers a range of sedimentary environments; mountain and upland, fluvial, lacustrine, arid, urban, deltaic and estuarine, temperate coastal, tropical coastal, and continental shelf aspects of sediment management and remediation are also considered as are the potential impacts of on-going and future climatic and environmental change Readership: advanced level undergraduates in earth science, environmental science and physical geography, and graduate students in the earth and environmental sciences with an interest in contemporary sediment systems

Implications for Global Exploration and Production

Sedimentology, Geographical Distribution and Economic Importance

The Identification, Description and Characterization of Hydrocarbon Reservoirs in Carbonate Rocks

Carbonates

Carbonate Platform Systems

Recent Developments and Applications, AAPG Memoir 57

Encyclopedia of Geology, Second Edition presents in six volumes state-of-the-art reviews on the various aspects of geologic research, all of which have moved on

considerably since the writing of the first edition. New areas of discussion include extinctions, origins of life, plate tectonics and its influence on faunal provinces, new types of mineral and hydrocarbon deposits, new methods of dating rocks, and geological processes. Users will find this to be a fundamental resource for teachers and students of geology, as well as researchers and non-geology professionals seeking up-to-date reviews of geologic research. Provides a comprehensive and accessible one-stop shop for information on the subject of geology, explaining methodologies and technical jargon used in the field Highlights connections between geology and other physical and biological sciences, tackling research problems that span multiple fields Fills a critical gap of information in a field that has seen significant progress in past years Presents an ideal reference for a wide range of scientists in earth and environmental areas of study

With original data in various fields from the offshore Levant Basin and adjacent continental slopes and platforms, these papers document the tectonic structures and sedimentological patterns associated with the development of the Levant Basin.

This book is the first comprehensive documentation and interpretation of modern neritic carbonate sediments on the southern Australian continental margin, the

largest cool-water carbonate depositional system on the globe. The approach is classical but the information is new. A brief chapter of introduction is followed by a section that describes the setting of the continental margin in terms of the regional geology, its evolution through time, the climate, and the complex oceanography. The setting is further explored in chapter 3 that outlines the Pleistocene history of sedimentation in this region. This is particularly important since many of the surficial sediments have a partial older history. The following section on the carbonate factory describes in detail the nature of the animals and plants that determine the nature of the sediments and the environmental conditions that control their distribution. The shelf itself cannot be discussed in isolation and thus a short chapter on the marginal marine environment is presented. The core of the book comprises two chapters that document the suite of depositional facies and their composition and then the suite of depositional environments where these sediments are found. The variety of deposits in this vast area is such that three chapters are devoted to the character of the materials on the southwestern shelf the south Australian sea and the southeastern shelf. The diagenesis that affects these sediments is tackled in a chapter after all the attributes are documented because they are intimately linked to different controls. The book finishes with a summary chapter that also addresses the various

controls on sedimentation and models the effects to be expected when these are changed outside those present in the current realm. Audience: The book is an invaluable source of information about this vast region and will be a critical reference for researchers, graduate students, and professionals engaged in marine and environmental research. It will be of particular importance for geologists interpreting the ancient rock record.

Comparing the Geological and Fossil Records

The Geology and Economic Resources of the Cambrian-Ordovician Sauk Megasequence of Laurentia, AAPG Memoir 98

Geological Survey of Canada, Open File 3674

Components and Interactions

Depositional Systems and Palaeoenvironmental Controls

Microfacies of Carbonate Rocks

The Oligocene and Miocene Epochs comprise the most important phases in the Cenozoic global cooling that led from a greenhouse to an icehouse Earth. Recent major advances in the understanding and time-resolution of climate events taking place at this time, as well as the proliferation of studies on Oligocene and Miocene shallow-water/neritic carbonate systems, invite us to re-evaluate the significance of these carbonate systems in the context of changes in climate and Earth surface processes. Carbonate systems, because of a wide dependence on the ecological requirements of organisms producing the sediment, are

sensitive recorders of changes in environmental conditions on the Earth surface. The papers included in this Special Publication address the dynamic evolution of carbonate systems deposited during the Oligocene and Miocene in the context on climatic and Earth surfaces processes focusing on climatic trends and controls over deposition; temporal changes in carbonate producers and palaeoecology; carbonate terminology; facies; processes and environmental parameters (including water temperature and production depth profiles); carbonate producers and their spatial and temporal variability; and tectonic controls over architecture. This book is part of the International Association of Sedimentologists (IAS) Special Publications. The Special Publications from the IAS are a set of thematic volumes edited by specialists on subjects of central interest to sedimentologists. Papers are reviewed and printed to the same high standards as those published in the journal *Sedimentology* and several of these volumes have become standard works of reference.

An accessible resource, covering the fundamentals of carbonate reservoir engineering  
Includes discussions on how, where and why carbonate are formed, plus reviews of basic sedimentological and stratigraphic principles to explain carbonate platform characteristics and stratigraphic relationships  
Offers a new, genetic classification of carbonate porosity that is especially useful in predicting spatial distribution of pore networks. Includes a solution manual

This book provides an up-to-date compilation of the latest research on the petrography, facies, paleoenvironmental significance and economic aspects of continental carbonates. The overall organization of the book first emphasizes the descriptive aspects and processes

operating on carbonate deposits in greatly varied settings, and then considers applications for basin analysis, as well as economic and historical aspects. This volume will be a valuable tool for graduate and postgraduate students as well as for experienced researchers. The second part (volume 62 in this series) will deal with the geochemistry, diagenesis and applications of carbonates in continental settings. Covering the greatly varied aspects of carbonate deposits from continental settings deposits Clear and easy to follow organization Up to date information, so readers can find references from the classic literature to the most recent research

Facies, Environments, and Processes

New Publications of the Geological Survey

Implications for Biodiversity Studies

Carbonate Sequence Stratigraphy

Geological Survey Bulletin

Global Geological Record of Lake Basins: Volume 1

Sedimentology has seen many significant advances and changes over the past 40 years, ranging from facies modelling to sequence stratigraphy; chemostratigraphy to basin analysis; and the integration of studies of physical, chemical and, increasingly, biological processes in the interpretation and prediction of sedimentary environments and products. The subject is becoming ever more interdisciplinary and applied, and now has far more links to other physical sciences. Research and debate are continuing afresh as we move into this new interdisciplinary phase and promise many developments and increased uses of our subject. Now seemed a good time to publish a series of review papers concerning some key current areas of research. We hope that these papers will provide comprehensive starting points for those

wishing to become acquainted with an area, act as stimuli for debate, and provide awareness and ideas for future research avenues. No issue of this sort can, of course, ever be truly comprehensive in its coverage: these reviews concern only selected snippets from the wide scope of sedimentology and each has, of necessity, been selective in its own area.

This is the first of a series of volumes that will assess key lacustrine sequences worldwide.

This Proceedings volume contains papers from three symposia which were held during the 29th International Geological Congress, Kyoto, Japan, 24 August--3 September 1992. From the first symposium --- "Metamorphic Reactions: kinetics and mass transfer" --- 5 papers were selected for publication. One of the objectives of the symposium was to clarify the nature of reactions and mass transfer from the viewpoint of kinetics. From the "Sandstone Petrology in Relation to Tectonics"-symposium, 10 papers were selected and revised for inclusion in this book. The articles reflect the different approaches on the relationship between sandstone composition and tectonic setting. The third symposium in this volume --- "Evaporite and Desert Environment" consists of 8 selected papers. The papers summarize the relationship between various desertification factors and the dynamics of different regions, and the classification of these regions according to their geological and mineralogical factors.

Kyoto, Japan, 24 August-3 Septmeber 1992

Proceedings of the 29th International Geological Congress

Informing Science and Engineering

Advances, Impacts, and Interactions

Geological Prior Information

Millenium Reviews - The Journal of the International Association of Sedimentologists

*Hardcover plus Foldouts*

*Carbonate reservoirs contain an increasingly important percentage of the world's hydrocarbon reserves. This volume presents key recent advances in carbonate exploration and reservoir analysis.*

*This work provides a wide perspective of the oceans by examining their places in the earth sciences, drawing together all the key strands of ocean study and presenting a holistic view of ocean processes, ancient and modern.*

*Carbonate Sedimentology*

*Carbonates in Continental Settings*

*Cenozoic Carbonate Systems of Australasia*

*Sedimentology*

*U.S. Geological Survey Bulletin*

*Neritic Carbonate Sediments in a Temperate Realm*