Stratigraphic Reservoir Characterization For Petroleum Geologists Geophysicists And Engineers Volume 61 Second Edition Developments In Petroleum Science

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Giant Hydrocarbon Reservoirs of The World Academic Press There are many tools and techniques for characterizing oil and gas reservoirs. Seismic-reflection techniques include conventional 2D and 3D seismic, 4D time-lapse seismic, multicomponent seismic, crosswell seismic, seismic inversion, and seismic attribute analysis, all designed to enhance stratigraphy/structure detection, resolution, and characterization. These techniques are constantly being improved. Drilling and coring a well provides the “ ground truth ” for seismic interpretation. Rock formations are directly sampled by cuttings and by core and indirectly characterized with a variety of conventional and specialized well logs. To maximize characterization and optimize production, many of these tools as possible should be employed. It is often less expensive to utilize a wide variety of tools that directly image or measure reservoir properties at different scales than to drill one or two dry holes.

Characterizing Compartmentalization of a Petroleum Reservoir by Integrating Sequence Stratigraphy, 3-D Seismic Interpretation, and Production Data, Sorrento Field, Colorado, USA Elsevier Inc. Chapters Volcanic gas reservoirs are the new natural gas frontier. Once thought too complex, too harsh on the drilling bit, and too difficult to characterize, reservoir engineers and petroleum geologists alike now manage more advanced seismic and logging tools, making these "impossible" field developments possible. Bridging meaningful

information about these complicated provinces and linking various unconventional methods and techniques, Volcanic Gas Reservoir Characterization: Describes a set of leading-edge integrated volcanic gas reservoir characterization techniques, helping to ensure the effective development of the field Reveals the grade and relationship of volcanic stratigraphic sequence Presents field identification and prediction methods, and interpretation technology of reservoir parameters, relating these to similar complex fields such as shale These innovative approaches and creative methods have been successfully applied to actual development of volcanic gas reservoirs. By sharing the methods and techniques used in this region with reservoir engineers and petroleum geologists all over the world, those with better understanding of these unconventional basins will begin to consider volcanic rock like any other reservoir. Summarizes the research and explains detailed case studies of volcanic gas reservoir developments, showing the latest achievements and lessons learned Supplies knowledge on volcanic gas reservoir basins to provide meaningful insight into similar complex reservoirs such as shale, coal bed methane, and heavy oil basins Contains extensive methodology, strong practicality and high innovation, making this an ideal book for both the practicing and seasoned reservoir engineer and petroleum geologists working

with complex reservoirs

Seismic Stratigraphy, Basin Analysis and Reservoir Characterisation Elsevier Inc. Chapters

Reservoir characterization as a discipline grew out of the recognition that more oil and gas could be extracted from reservoirs if the geology of the reservoir was understood. Prior to that awakening, reservoir development and production were the realm of the petroleum engineer. In fact, geologists of that time would have felt slighted if asked by corporate management to move from an exciting exploration assignment to a more mundane assignment working with an engineer to improve a reservoir ' s performance. Slowly, reservoir characterization came into its own as a quantitative, multidisciplinary endeavor requiring a vast array of skills and knowledge sets. Perhaps the biggest attractor to becoming a reservoir geologist was the advent of fast computing, followed by visualization programs and theaters, all of which allow young geoscientists to practice their computing skills in a highly technical work environment. Also, the discipline grew in parallel with the evolution of data integration and the advent of asset teams in the petroleum industry. Finally, reservoir characterization flourished with the quantum improvements that have occurred in geophysical acquisition and processing techniques and that allow geophysicists to image internal reservoir complexities.

Geophysics for Petroleum Engineers Elsevier Inc. Chapters

Certain parts of this chapter have been taken directly from the

publication Important geological properties of unconventional resource shales, by Roger M. Slatt, published in the fourth-quarter issue of the Central European Journal of Geosciences (2011). The journal's permission to reproduce those parts of that paper here is gratefully acknowledged.

Carbonate Reservoir Characterization: A Geologic-Engineering Analysis Elsevier Inc. Chapters

This book provides a comprehensive overview of the parameters and factors that cause heterogeneity in carbonate reservoirs, and examines how they interact with one another. It explores the various scales of heterogeneity, how they are caused, and how they can be minimized, as well as how the scales affect each other, providing practical examples in each chapter. The book concludes by discussing the effect of heterogeneity on petrophysical evaluations. As reducing heterogeneity is the only way to obtain accurate carbonate reservoir characteristics at the regional scale, the book offers an important reference guide for all geologists, engineers, and modelers working with subsurface data.

Stratigraphic Reservoir Characterization for Petroleum Geologists, Geophysicists, and Engineers Geological Society of London

This chapter has summarized the important characteristics of deepwater deposits and reservoirs. These reservoirs are quite complex and variable. An understanding of the different architectural elements and their interrelations is critical to hydrocarbon recovery, because the elements exhibit different external geometries, sizes, spatial orientations, and internal sedimentary and stratigraphic features. Because of these differences, the volume of hydrocarbons and the anticipated recovery efficiency will vary by architectural element (). There are many new and awaiting opportunities for deepwater reservoirs both onshore and offshore. The US Gulf of Mexico and many other parts of the world are hot spots or emerging areas for exploration and development of vast resources of oil and gas (Fig. 11.93).

Reservoir Characterization Springer Science & Business Media Accurate reservoir characterization is a key step in developing, monitoring, and managing a reservoir and optimizing production. To achieve accuracy and to ensure that all the information available at any given time is incorporated in the reservoirmodel, reservoir characterizationmust be dynamic. To achieve this goal, however, one starts with a simple model of the reservoir at a given time point (a static model). As new petrophysical, seismic, and production data become available, the reservoir model is updated to account for the changes in the reservoir. The updated model would be a better representative of the current status of the reservoir. Both static reservoir properties,

such as porosity, permeability, and facies type; and dynamic reservoir properties, such as pressure, fluid saturation, and temperature, needs to be updated as more field data become available. Characterizing a reservoir by updating of both static and dynamic reservoir properties during the life of the field is referred to as dynamic reservoir characterization. Dynamic reservoir characterization is discussed in , dealing with time lapse or 4D geophysical data and reservoir monitoring. This chapter, however, focuses on static reservoir characterization.

Stratigraphic Traps Elsevier

The interest in seismic stratigraphic techniques to interpret reflection datasets is well established. The advent of sophisticated subsurface reservoir studies and 4D monitoring, for optimising the hydrocarbon production in existing fields, does demonstrate the importance of the 3D seismic methodology. The added value of reflection seismics to the petroleum industry has clearly been proven over the last decades. Seismic profiles and 3D cubes form a vast and robust data source to unravel the structure of the subsurface. It gets nowadays exploited in ever greater detail. Larger offsets and velocity anisotropy effects give for instance access to more details on reservoir flow properties like fracture density, porosity and permeability distribution, Elastic inversion and modelling may tell something about the change in petrophysical parameters. Seismic investigations

provide a vital tool for the delineation of subtle hydrocarbon traps. They are the basis for understanding the regional basin framework and the stratigraphic subdivision. Seismic stratigraphy combines two very different scales of observation: the seismic and well-control. The systematic approach applied in seismic stratigraphy explains why many workers are using the principles to evaluate their seismic observations. The here presented modern geophysical techniques allow more accurate prediction of the changes in subsurface geology. Dynamics of sedimentary environments are discussed with its relation to global controling factors and a link is made to high-resolution sequence stratigraphy. ‘Seismic Stratigraphy Basin Analysis and Reservoir Characterisation’ summarizes basic seismic interpretation techniques and demonstrates the benefits of intergrated reservoir studies for hydrocarbon exploration. Topics are presented from a practical point of view and are supported by well-illustrated case histories. The reader (student as well as professional geophysicists, geologists and reservoir engineers) is taken from a basic level to more advanced study techniques. * Overview reflection seismic methods and its limitations. * Link between basic seismic stratigraphic principles and high resolution sequence stratigraphy. * Description of various techniques for seismic reservoir characterization and synthetic modelling. *

Overview nversion techniques, AVO and seismic attributes analysis.

Uncertainty Analysis and Reservoir Modeling

Elsevier

Sandstone Petroleum Reservoirs presents an integrated, multidisciplinary approach to the geology of sandstone oil and gas reservoirs. Twenty-two case studies involving a variety of depositional settings, tectonic provinces, and burial/diagenetic histories emphasize depositional controls on reservoir architecture, petrophysical properties, and production performance. An introductory section provides perspective to the nature of reservoir characterization and highlights the important questions that future studies need to address. A "reservoir summary" following each case study aids the reader in gaining quick access to the main characteristics of each reservoir. This casebook is heavily illustrated, and most data have not been previously published. The intended audience comprises a broad range of practicing earth scientists, including petroleum geologists, geophysicists, and engineers. Readers will value the integration of geological versus engineering interests provided here, and will be enabled to improve exploration and production results.

Stratigraphic Reservoir

Characterization for Petroleum Geologists, Geophysicists, and Engineers AAPG
Globally, deltas often contain major oil and gas reservoirs. The geometry, size, and internal architecture of deltas are functions of many variables related to the delta's mode of formation. A tripartite classification of deltas, into river-, wave-, and tide-dominated deltas, has been a standard for many years. However, even within each of these delta types, the distribution of properties can vary considerably depending on the delta's depositional history and the relative influence of rivers, waves, and tides. With regard to reservoir performance and optimization, perhaps the most significant difference in delta properties is in orientation and continuity of sand (reservoir) and shale (barrier) trends. Reservoir quality also varies according to the facies within the delta. To maximize hydrocarbon production, it is not sufficient to merely classify the reservoir as a delta. A complete understanding of the characteristics and variations of an individual delta's reservoir is required for proper well placement and reservoir management.
Carbonate Reservoir Characterization Elsevier Inc. Chapters
This second volume on carbonate reservoirs completes the two-volume treatise on this important topic for petroleum engineers and geologists. Together, the volumes form a complete, modern reference to the properties and production behaviour of carbonate petroleum reservoirs. The book contains valuable

glossaries to geologic and petroleum engineering terms providing exact definitions for writers and speakers. Lecturers will find a useful appendix devoted to questions and problems that can be used for teaching assignments as well as a guide for lecture development. In addition, there is a chapter devoted to core analysis of carbonate rocks which is ideal for laboratory instruction. Managers and production engineers will find a review of the latest laboratory technology for carbonate formation evaluation in the chapter on core analysis. The modern classification of carbonate rocks is presented with petroleum production performance and overall characterization using seismic and well test analyses. Separate chapters are devoted to the important naturally fractured and chalk reservoirs. Throughout the book, the emphasis is on formation evaluation and performance. This two-volume work brings together the wide variety of approaches to the study of carbonate reservoirs and will therefore be of value to managers, engineers, geologists and lecturers.

Carbonate Reservoir Heterogeneity Elsevier Inc. Chapters

This chapter has summarized the concepts, techniques, and definitions of sequence stratigraphy. As in most subdivisions of geology, sequence stratigraphers have developed their own set of definitions and terminology, which have been outlined here for use in subsequent chapters. It is proposed that sequence stratigraphy form the basis for reservoir characterization, as will be expanded upon in subsequent chapters.

Stratigraphic Reservoir Characterization for Petroleum Geologists, Geophysicists, and Engineers Elsevier Inc.

Chapters
This second volume on carbonate reservoirs completes the two-volume treatise on this important topic for petroleum engineers and geologists. Together, the volumes form a complete, modern reference to the properties and production behaviour of carbonate petroleum reservoirs. The book contains valuable glossaries to geologic and petroleum engineering terms providing exact definitions for writers and speakers. Lecturers will find a useful appendix devoted to questions and problems that can be used for teaching assignments as well as a guide for lecture development. In addition, there is a chapter devoted to core analysis of carbonate rocks which is ideal for laboratory instruction. Managers and production engineers will find a review of the latest laboratory technology for carbonate formation evaluation in the chapter on core analysis. The modern classification of carbonate rocks is presented with petroleum production performance and overall characterization using seismic and well test analyses. Separate chapters are devoted to the important naturally fractured and chalk reservoirs. Throughout the book, the emphasis is on formation evaluation and performance. This two-volume work brings together the wide variety of approaches to the study of carbonate reservoirs and will therefore be of value to managers, engineers, geologists and lecturers.

Applied Techniques to Integrated Oil and Gas Reservoir Characterization

Elsevier Inc. Chapters

In summary, physical, biogenic, and chemical sedimentary structures are important to many aspects of reservoir characterization and should be included in every characterization, whether the analyst is using cores,

borehole-image logs, or an analog outcrop. Sedimentary structures provide important information about the depositional environment of the reservoir rock, and from that information, one can determine the extent and geometry of the reservoir, its trend, and any likely impediments to hydrocarbon production. Porosity and permeability and, in particular, fluid-flow paths are also affected and guided by how the sediment grains are arranged into specific structures. Finally, one should bear in mind that some sedimentary structures can produce misleading or erroneous well-log results.

Stratigraphic Reservoir Characterization for Petroleum Geologists, Geophysicists, and Engineers Elsevier Inc. Chapters

An accessible resource, covering the fundamentals of carbonatereservoir engineering Includes discussions on how, where and why carbonate areformed, plus reviews of basic sedimentological and stratigraphicprinciples to explain carbonate platform characteristics andstratigraphic relationships Offers a new, genetic classification of carbonate porosity thatis especially useful in predicting spatial distribution of porenetworks. Includes a solution manual

Naturally Fractured Reservoir Characterization Newnes

In this chapter, the principles of reservoir modeling, workflows and their applications have been summarized. Reservoir modeling is a multi-disciplinary process that requires cooperation from geologists,

geophysicists, reservoir engineers, petrophysics and financial individuals, working in a team setting. The best model is one that provides quantitative properties of the reservoir, though this is often difficult to achieve. There are three broad steps in the modeling process. The team needs to first evaluate the data quality, plan the proper modeling workflow, and understand the range of uncertainties of the reservoir. The second step is data preparation and interpretation, which can be a long, tedious, but essential process, which may include multiple iterations of quality control, interpretation, calibration and tests. The third step is determining whether to build a deterministic (single, data-based model) or stochastic (multiple geostatistical iterations) model. The modeling approach may be decided by the quality and quantity of the data. There is no single rule of thumb because no two reservoirs are identical. Object-based stochastic modeling is the most widely used modeling method today. The modeling results need to be constrained and refined by both geologic and mathematical validation. Variogram analysis is very important in quality control of object-based stochastic modeling. Outcrops are excellent sources of continuous data which can be incorporated into subsurface reservoir

modeling either by 1) building an outcrop “reservoir” model, or 2) identifying and developing outcrop analogs of subsurface reservoirs. Significant upscaling of a reservoir model for flow simulation may well result in an erroneous history match because the upscaling process often deletes lateral and vertical heterogeneities which may control or affect reservoir performance, particularly in a deterministic model. Reservoir uncertainties are easier to manipulate by object-based stochastic models. Choosing the best realization approach for the reservoir model is the key to predicting reservoir performance in the management of reservoirs.

Carbonate reservoir characterization Elsevier

Reservoir characterization as a discipline grew out of the recognition that more oil and gas could be extracted from reservoirs if the geology of the reservoir was understood. Prior to that awakening, reservoir development and production were the realm of the petroleum engineer. In fact, geologists of that time would have felt slighted if asked by corporate management to move from an exciting exploration assignment to a more mundane assignment working with an engineer to improve a reservoir’s performance. Slowly, reservoir characterization came into its own as a quantitative, multidisciplinary endeavor requiring a vast array of

skills and knowledge sets. Perhaps the biggest attractor to becoming a reservoir geologist was the advent of fast computing, followed by visualization programs and theaters, all of which allow young geoscientists to practice their computing skills in a highly technical work environment. Also, the discipline grew in parallel with the evolution of data integration and the advent of asset teams in the petroleum industry. Finally, reservoir characterization flourished with the quantum improvements that have occurred in geophysical acquisition and processing techniques and that allow geophysicists to image internal reservoir complexities. Practical resource describing different types of sandstone and shale reservoirs Case histories of reservoir studies for easy comparison Applications of standard, new, and emerging technologies

Stratigraphic Reservoir Characterization for Petroleum Geologists, Geophysicists, and Engineers Springer Nature Reservoir management is an important topic in the oil industry today. Conferences, forums, short courses, and technical papers, written and attended by engineers, geologists, geophysicists, petrophysicists, and managers discuss various aspects of reservoir management. A critical component of reservoir management is the accurate characterization of the hydrocarbon asset, called reservoir characterization. The topic of this course is the process of sequence-

stratigraphic interpretation and characterization of carbonate reservoirs. Because of the overwhelming mass of information most reservoir geoscientists keep up with either some aspects of sequence-stratigraphy, or some aspects of reservoir characterization, but typically not both. The authors believe that the two disciplines are so intimately related that the sequence framework should be considered a critical piece of the integrated puzzle.

Reservoir Characterization Springer

Over the past several years, there has been a growing integration of data – geophysical, geological, petrophysical, engineering-related, and production-related – in predicting and determining reservoir properties. As such, geoscientists now must learn the technology, processes, and challenges involved within their specific functions in order to optimize planning for oil field development. Applied Techniques to Integrated Oil and Gas Reservoir Characterization presents challenging questions encountered by geoscientists in their day-to-day work in the exploration and development of oil and gas fields and provides potential solutions from experts. From basin analysis of conventional and unconventional reservoirs, to seismic attributes analysis, NMR for reservoir characterization, amplitude versus offset (AVO), well-to-seismic tie, seismic inversion studies, rock physics, pore

pressure prediction, and 4D for reservoir monitoring, the text examines challenges in the industry as well as the techniques used to overcome those challenges. This book includes valuable contributions from global industry experts: Brian Schulte (Schiefer Reservoir Consulting), Dr. Neil W. Craigie (Saudi Aramco), Matthijs van der Molen (Shell International E&P), Dr. Fred W. Schroeder (ExxonMobil, retired), Dr. Tharwat Hassane (Schlumberger & BP, retired), and others. Presents a thorough understanding of the requirements of various disciplines in characterizing a wide spectrum of reservoirs Includes real-life problems and challenging questions encountered by geoscientists in their day-to-day work, along with answers from experts working in the field Provides an integrated approach among different disciplines (geology, geophysics, petrophysics, and petroleum engineering) Offers advice from industry experts to geoscience students, including career guides and interview tips

Stratigraphic Reservoir Characterization for Petroleum Geologists, Geophysicists, and Engineers Editions

TECHNIP

Shallow marine environments, from the shoreline to the shelf edge, are complex and result in complex deposits. In turn,

complex deposits translate into complex reservoirs. To maximize reservoir performance, it is imperative that we understand the type of shallow marine deposit that makes up the reservoir. That is not an easy task, as is exemplified by the various interpretations that have been assigned to linear sandstones of the U.S. Cretaceous Western Interior Seaway. These sandstones, in both outcrop and subsurface reservoirs, have been interpreted to be offshore shelf bars or ridges, shoreface bodies, and incised valley fill. Interpreting the type of deposit is not merely an academic exercise, it is essential because each of these different types of sandstone bodies is characterized by different geometries and degrees of compartmentalization. There are numerous examples of shoreface deposits that are truncated by younger incised valley fill. Subtle variations in gamma-ray log response can be used to identify such strata. Barrier-island deposits provide a particularly challenging reservoir characterization problem. Because of the variety of sedimentary processes that can influence barrier-island formation, several different sandstone and shale geometries and trends can occur. That variation in geometries can lead to the potential for a high degree of compartmentalization that is difficult to predict. Again, depositional-geometry prediction and well placement are facilitated by an understanding of the nature of the deposit and how it was formed.