Petrel Geology And Modeling 2013 Schlumberger Software

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Stratigraphic Reservoir Characterization for Petroleum Geologists, Geophysicists, and Engineers

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Applied Subsurface Geological Mapping with Structural Methods John Wiley & Sons
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
Regional Geology and Tectonics: Principles of Geologic Analysis Springer
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.
Uncertainty Analysis and Reservoir Modeling Elsevier
This is a compilation of keynote papers from the 2002 Conference of the Canadian Society of Petroleum Geologists and the 2004 Annual Conference of the American Association of Petroleum Geologists and SEPM. These sessions, entitled Facies Models Revisited, were intended to capture the state of the art with respect to facies modeling in several key depositional environments. This volume is focused on clastic depositional settings including continental (aeolian and fluvial), estuarine, shoreface, deltaic, shelf, and deep water. The approach that was encouraged with the authors was to follow a first-principles rather than a model-driven approach. This philosophy was to provide the reader with the tools and rules to create their own models rather than providing them with "canned" models or "templates". Following this approach, it is believed that geoscientists will develop better and more predictive facies of depositional models. The editors believe this volume will find a niche with both academic as well as industry and government geoscientists.
Carbonate Reservoir Characterization Springer Science & Business Media
The first comprehensive presentation of methods and algorithms used in basin modeling, this text provides geoscientists and geophysicists with an in-depth view of the underlying theory and includes advanced topics such as probabilistic risk assessment methods.
Development Geology Reference Manual Geological Society of London
This book gives practical advice and ready to use tips on the design and construction of subsurface reservoir models. The design elements cover rock architecture, petrophysical property modeling, multi-scale data integration, upscaling and uncertainty analysis. The intimate relationship between geology and fluid flow is explored throughout, showing how the impact of fluid type, production mechanism and the subtleties of single- and multi-phase flow combine to influence reservoir model design.
Facies Models Revisited AAPG
Applied Subsurface Geological Mapping, With Structural Methods, 2nd Edition is the practical, up-to-the-minute guide to the use of subsurface interpretation, mapping, and structural techniques in the search for oil and gas resources. Two of the industry's leading consultants present systematic coverage of the field's key principles and newest advances, offering guidance that is valuable for both exploration and development activities, as well as for "detailed" projects in maturely developed areas. Fully updated and expanded, this edition combines extensive information from the published literature with significant material never before published. The authors introduce superior techniques for every major petroleum-related tectonic setting in the world. Coverage includes: A systematic, ten-step philosophy for subsurface interpretation and mapping The latest computer-based contouring concepts and applications Advanced manual and computer-based log correlation Integration of geophysical data into subsurface interpretations and mapping Cross-section construction: structural, stratigraphic, and problem-solving Interpretation and generation of valid fault, structure, and isochore maps New coverage of 3D seismic interpretation, from project setup through documentation Compressional and extensional structures: balancing and interpretation In-depth new coverage of strike-slip faulting and related structures Growth and correlation consistency techniques: expansion indices, Multiple Bischke Plot Analysis, vertical separation versus depth, and more Numerous field examples from around the world Whatever your role in the adventure of finding and developing oil or gas resources–as a geologist, geophysicist, engineer, technologist, manager or investor–the tools presented in this book can make you significantly more effective in your daily technical or decision-oriented activities.
Enhance Oil and Gas Exploration with Data-Driven Geophysical and Petrophysical Models Newnes
Leverage Big Data analytics methodologies to add value to geophysical and petrophysical exploration data Enhance Oil & Gas Exploration with Data-Driven Geophysical and Petrophysical Models demonstrates a new approach to geophysics and petrophysics data analysis using the latest methods drawn from Big Data. Written by two geophysicists with a combined 30 years in the industry, this book shows you how to leverage continually maturing computational intelligence to gain deeper insight from specific exploration data. Case studies illustrate the value

propositions of this alternative analytical workflow, and in-depth discussion addresses the many Big Data issues in geophysics and petrophysics. From data collection and context through real-world everyday applications, this book provides an essential resource for anyone involved in oil and gas exploration. Recent and continual advances in machine learning are driving a rapid increase in empirical modeling capabilities. This book shows you how these new tools and methodologies can enhance geophysical and petrophysical data analysis, increasing the value of your exploration data. Apply data-driven modeling concepts in a geophysical and petrophysical context Learn how to get more information out of models and simulations Add value to everyday tasks with the appropriate Big Data application Adjust methodology to suit diverse geophysical and petrophysical contexts Data-driven modeling focuses on analyzing the total data within a system, with the goal of uncovering connections between input and output without definitive knowledge of the system's physical behavior. This multi-faceted approach pushes the boundaries of conventional modeling, and brings diverse fields of study together to apply new information and technology in new and more valuable ways. Enhance Oil & Gas Exploration with Data-Driven Geophysical and Petrophysical Models takes you beyond traditional deterministic interpretation to the future of exploration data analysis.

The Future of Geological Modelling in Hydrocarbon Development Editions TECHNIP

Modelling of flow in naturally fractured reservoirs is quickly becoming mandatory in all phases of oil and gas exploration and production. Creation of a Static Conceptual Fracture Model (SCFM) is needed as input to create flow simulations for today and for prediction of flow into the future. Unfortunately, the computer modelers tasked with constructing the gridded fracture model are often not well versed in natural fracture characterization and are often forced to make quick decisions as to the input required by the software used to create these models. Static Conceptual Fracture Modelling: Preparing for Simulation and Development describes all the fracture and reservoir parameters needed to create the fracture database for effective modelling and how to generate the data and parameter distributions. The material covered in this volume highlights not only natural fracture system quantification and formatting, but also describes best practices for managing technical teams charged with creating the SCFM. This book will become a must on the shelf for all reservoir modelers.

Petroleum Geoscience AAPG

This volume is a compendium of papers on the subject, as noted in the book title, of modeling and mapping. They were presented at the 25th Anniversary meeting of the International Association for Mathematical Geology (IAMG) at Praha (Prague), Czech Republic in October of 1993. The Association, founded at the International Geological Congress (IGC) in Prague in 1968, returned to its origins for its Silver Anniversary celebration. All in all 146 papers by 276 authors were offered for the 165 attendees at the 3-day meeting convened in the Hotel Krystal. It was a time for remembrance and for future prognostication. The selected papers in Geologic Modeling and Mapping comprise a broad range of powerful techniques used nowadays in the earth sciences. Modeling stands for reconstruction of geological features, such as subsurface structure, in space and time, as well as for simulation of geological processes both providing scenarios of geologic events and how these events might have occurred. Mapping stands for spatial analysis of data, a topic that always has been an extremely important part of the earth sciences. Because both modeling and mapping are used widely in conjunction, the book title should reflect the close relation of the subjects rather than a division. Here, we bring together a collection of papers that hopefully contribute to the growing amount of knowledge on these techniques.

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

One main target in petroleum recovery is the description of of the three-dimensional distribution of petrophysical properties on the interwell scale in carbonate reservoirs, in order to improve performance predictions by means of fluid-flow computer simulations The book focuses on the improvement of geological, petrophysical, and geostatistical methods, describes the basic petrophysical properties, important geology parameters, and rock fabrics from cores, and discusses their spatial distribution. A closing chapter deals with reservoir models as an input into flow simulators.

Petrel 2011 AAPG

This book gives practical advice and ready to use tips on the design and construction of subsurface reservoir models. The design elements cover rock architecture, petrophysical property modelling, multi-scale data integration, upscaling and uncertainty analysis. Philip Ringrose and Mark Bentley share their experience, gained from over a hundred reservoir modelling studies in 25 countries covering clastic, carbonate and fractured reservoir types. The intimate relationship between geology and fluid flow is explored throughout, showing how the impact of fluid type, production mechanism and the subtleties of single- and multi-phase flow combine to influence reservoir model design. Audience: The main audience for this book is the community of applied geoscientists and engineers involved in the development and use of subsurface fluid resources. The book is suitable for a range of Master's level courses in reservoir characterisation, modelling and engineering. · Provides practical advice and guidelines for users of 3D reservoir modelling packages · Gives advice on reservoir model design for the growing world-wide activity in subsurface reservoir modelling · Covers rock modelling, property modelling, upscaling and uncertainty handling · Encompasses clastic, carbonate and fractured reservoirs

3D Geoscience Modeling Geological Society of America

This collection of papers presents documentation for (1) approaches to be taken in developing a geologic framework for explaining layering, heterogeneity, and compartmentalization of a reservoir; (2) the value of outcrop data in improving understanding of reservoir performance; (3) methods for integrating, analyzing, and displaying geologic, petrophysical rock property, and engineering data to be used during field evaluation, management, and simulation; (4) geostatistical approaches that are being used to characterize the spatial distribution of reservoir properties and augment geologic descriptions, and (5) methods of displaying quantitative models of reservoir properties and reservoir simulation in three dimensions.

Petrel 20 Years SEPM (Society for Sedimentary Geology)

Reservoir engineering fundamentals and applications along with well testing procedures This practical resource lays out the tools and techniques necessary to successfully construct petroleum reservoir models of all types and sizes. You will learn how to improve reserve estimations and make development decisions that will optimize well performance. Written by a pair of experts, Petroleum Reservoir Modeling and Simulation: Geology, Geostatistics, and Performance Prediction offers comprehensive coverage of quantitative modeling, geostatistics, well testing principles, upscaled models, and history matching. Throughout, special attention is paid to shale, carbonate, and subsea formations. Coverage includes: An overview of reservoir engineering Spatial correlation Spatial estimation Spatial simulation Geostatistical simulation constrained to higher-order statistics Numerical schemes for flow simulation Gridding schemes for flow simulation Upscaling of reservoir models History matching Dynamic data integration

Stratigraphic Reservoir Characterization for Petroleum Geologists, Geophysicists, and Engineers Elsevier Science & Technology

"This special volume contains a selection of articles presented at the AAPG Hedberg Research Conference on Basin and Petroleum System Modeling (BPSM) held in Napa, California, on May 3-8, 2009."--P. 1.

Seismic Reservoir Modeling John Wiley & Sons

Seismic reservoir characterization aims to build 3-dimensional models of rock and fluid properties, including elastic and petrophysical variables, to describe and monitor the state of the subsurface for hydrocarbon exploration and production and for CO2 sequestration. Rock physics modeling and seismic wave propagation theory provide a set of physical equations to predict the seismic response of subsurface rocks based on their elastic and petrophysical properties. However, the rock and fluid properties are generally unknown and surface geophysical measurements are often the only available data to constrain reservoir models far away from well control. Therefore, reservoir properties are generally estimated from geophysical data as a solution of an inverse problem, by combining rock physics and seismic models with inverse theory and geostatistical methods, in the context of the geological modeling of the subsurface. A probabilistic approach to the inverse problem provides the probability distribution of rock and fluid properties given the measured geophysical data and allows quantifying the uncertainty of the predicted results. The reservoir characterization problem includes both discrete properties, such as facies or rock types, and continuous properties, such as porosity, mineral volumes, fluid saturations, seismic velocities and density. Seismic Reservoir Modeling: Theory, Examples and Algorithms presents the main concepts and methods of seismic reservoir characterization. The book presents an overview of rock physics models that link the petrophysical properties to the elastic properties in porous rocks and a review of the most common geostatistical methods to interpolate and simulate multiple realizations of subsurface properties conditioned on a limited number of direct and indirect measurements based on spatial correlation models. The core of the book focuses on Bayesian inverse methods for the prediction of elastic petrophysical properties from seismic data using analytical and numerical statistical methods. The authors present basic and advanced methodologies of the current state of the art in seismic reservoir characterization and illustrate them through expository examples as well as real data applications to hydrocarbon reservoirs and CO2 sequestration studies.

Petroleum and Basin Evolution Pearson Education

Faults commonly trap fluids such as hydrocarbons and water and therefore are of economic significance. During hydrocarbon field development, smaller faults can provide baffles and/or conduits to flow. There are relatively simple, well established workflows to carry out a fault seal analysis for siliciclastic rocks based primarily on clay content. There are, however, outstanding challenges related to other rock types, to calibrating fault seal models (with static and dynamic data) and to handling uncertainty. The variety of studies presented here demonstrate the types of data required and workflows followed in today's environment in order to understand the uncertainties, risks and upsides associated with fault-related fluid flow. These studies span all parts of the hydrocarbon value chain from exploration to production but are also of relevance for other industries such as radioactive waste and CO2 containment.

Fundamentals of Basin and Petroleum Systems Modeling John Wiley & Sons

The 3D geological model is still regarded as one of the newest and most innovative tools for reservoir management purposes. The computer modelling of structures, rock properties and fluid flow in hydrocarbon reservoirs has evolved from a specialist activity to part of the standard desktop toolkit. The application of these techniques has allowed all disciplines of the subsurface team to collaborate in a common workspace. In today's asset teams, the role of the geological model in hydrocarbon development planning is key and will be for some time ahead. The challenges that face the geologists and engineers will be to provide more seamless interaction between static and dynamic models. This interaction requires the development of conventional and unconventional modelling algorithms and methodologies in order to provide more risk-assessed scenarios, thus enabling geologists and engineers to better understand and capture inherent uncertainties at each aspect of the geological model's life.

Stochastic Modeling and Geostatistics Oxford University Press

This book discusses topical issues of detailed seismic data interpretation using high-resolution seismic (HRS) techniques, which are based on the numerical method developed by the authors for solving the inverse dynamic seismic problem (IDSP). The authors highlight the range of issues related to the development and application of HRS-Geo technologies on a variety of seismic data, and analyze a significant amount of practical material in various seismic and geological conditions. This analysis allows for the accurate estimation of geological indicators in sediments that are most important for the prediction and exploration of oil and gas deposits, including lithological composition, reservoir properties, and the nature and degree of reservoir rock saturation with fluids. The book is intended for professionals involved in seismic data processing and geological interpretation, students of geophysical and geological specialties, graduate students of these specializations.

Computer Graphics in Geology AAPG

"Petrel seismic to simulation software helps increase reservoir performance by improving asset team productivity. Geophysicists, geologists, and reservoir engineers can develop collaborative workflows and integrate operations to streamline processes"--Page [2].

Reservoir Model Design Springer Nature

Petroleum exploration has always been limited by the lack of adequate subsurface control. Exploration problems are usually problems of extrapolation i.e. to greater depth, to laterally equivalent rocks, or back through time.Models are widely used as a way of describing complex geological systems so that they can be treated quantitatively and used as the basis for extrapolations and predictions. Models consider, typically, a simplified geological system that can be described mathematically. It is very important to know what simplifying assumptions have been made, when these assumptions are valid, and under what conditions their use may not be appropriate. This requires an understanding of the concepts involved in building the model and how the model operates.Models are best used as a tool for probing the system and evaluating the sensitivity of the conclusions to possible uncertainties in the values of the input parameters. In a sense, models permit experimental petroleum geochemistry and allow the user to answer the What if? questions e.g. What if the geothermal gradient had been higher in the past? What if the organic matter type had been different?This book provides students, exploration geologists, and others who would like to use the available models, with a general idea of how the models work, what they can do, and what their limitations are.It also provides the information necessary to obtain the input data required by the commercial models.