

Geomechanical And Petrophysical Properties Of Mudrocks

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Geophysics and Geosequestration - Thomas L. Davis
2019-05-09

An overview of the geophysical techniques and analysis methods for monitoring subsurface carbon dioxide storage for researchers and industry practitioners.

Rock Mechanics for Natural Resources and Infrastructure Development - Full Papers - Sergio A.B. da Fontoura
2019-09-03

Rock Mechanics for Natural Resources and Infrastructure Development contains the proceedings of the 14th ISRM International Congress (ISRM 2019, Foz do Iguacu, Brazil, 13-19 September 2019). Starting in 1966 in Lisbon, Portugal, the International Society for Rock Mechanics and Rock Engineering (ISRM) holds its Congress every four years. At this 14th occasion, the Congress brings together researchers, professors, engineers and

students around contemporary themes relevant to rock mechanics and rock engineering. Rock Mechanics for Natural Resources and Infrastructure Development contains 7 Keynote Lectures and 449 papers in ten chapters, covering topics ranging from fundamental research in rock mechanics, laboratory and experimental field studies, and petroleum, mining and civil engineering applications. Also included are the prestigious ISRM Award Lectures, the Leopold Muller Award Lecture by professor Peter K. Kaiser. and the Manuel Rocha Award Lecture by Dr. Quinghua Lei. Rock Mechanics for Natural Resources and Infrastructure Development is a must-read for academics, engineers and students involved in rock mechanics and engineering. Proceedings in Earth and geosciences - Volume 6 The 'Proceedings in Earth and geosciences' series contains

proceedings of peer-reviewed international conferences dealing in earth and geosciences. The main topics covered by the series include: geotechnical engineering, underground construction, mining, rock mechanics, soil mechanics and hydrogeology.

Petroleum Related Rock Mechanics - Erling Fjar
2008-01-04

Engineers and geologists in the petroleum industry will find *Petroleum Related Rock Mechanics, 2e*, a powerful resource in providing a basis of rock mechanical knowledge - a knowledge which can greatly assist in the understanding of field behavior, design of test programs and the design of field operations. Not only does this text give an introduction to applications of rock mechanics within the petroleum industry, it has a strong focus on basics, drilling, production and reservoir engineering. Assessment of rock mechanical parameters is covered in depth, as is acoustic wave propagation in rocks, with possible link to 4D seismics as well as log interpretation. Learn the basic principles behind rock mechanics from leading academic and industry experts. Quick reference and guide for engineers and geologists working in the field. Keep informed and up to date on all the latest methods and fundamental concepts.

Unconventional Oil and Gas Resources - Usman Ahmed
2016-04-05

As the shale revolution continues in North America, unconventional resource markets are emerging on every continent. In the next eight to ten years, more than 100,000 wells and one- to two-million hydraulic fracturing stages could be executed, resulting in close to one trillion dollars in industry spending. This growth has prompted professionals experienced in conventional oil and gas exploitation and development to

acquire practical knowledge of the unconventional realm. *Unconventional Oil and Gas Resources: Exploitation and Development* provides a comprehensive understanding of the latest advances in the exploitation and development of unconventional resources. With an emphasis on shale, this book: Addresses all aspects of the exploitation and development process, from data mining and accounting to drilling, completion, stimulation, production, and environmental issues. Offers in-depth coverage of sub-surface measurements (geological, geophysical, petrophysical, geochemical, and geomechanical) and their interpretation. Discusses the use of microseismic, fiber optic, and tracer reservoir monitoring technologies and JewelSuite™ reservoir modeling software. Presents the viewpoints of internationally respected experts and researchers from leading exploration and production (E&P) companies and academic institutions. Explores future trends in reservoir technologies for unconventional resources development. *Unconventional Oil and Gas Resources: Exploitation and Development* aids geologists, geophysicists, petrophysicists, geomechanic specialists, and drilling, completion, stimulation, production, and reservoir engineers in the environmentally safe exploitation and development of unconventional resources like shale.

The APPEA Journal - 2002

Sedimentary Petrology - Stuart J. Jones 2023-03-07
Authoritative, accessible, and updated introduction to sedimentary rocks for undergraduate students. *Sedimentary Petrology* provides readers with a concise account of sedimentary rock composition, mineralogy, texture, structure, diagenesis, and depositional environments. The new edition of this classic text incorporates the

many technological and analytical advances of the last decade, revealing exciting details of processes such as microbial precipitation, how microporosity is created within mudrocks, and the chemical composition of foraminifera deposits, which can be a key indicator for changing seawater temperature. This fourth edition offers a comprehensive update and expansion of the previous editions with a new set of illustrations, new references, and further reading. The new co-author Stuart Jones has brought his considerable expertise in clastic sedimentology to the rewritten chapters on sandstones and mudrocks. The addition of color images throughout the text will aid students immensely in their studies and petrographic fieldwork. Sample topics covered in *Sedimentary Petrology* include: Advances in modeling and programming to simulate depositional-diagenetic conditions and controls which support field-lab descriptions and interpretations Ocean acidification and the demise of coral reefs, and the role of the oceans in carbon capture and storage Sedimentary ironstones and iron-formations, sedimentary phosphate deposits, coal, oil shale and petroleum, and cherts and siliceous sediments Limestones, evaporites, volcanoclastic sediments, sandstones, conglomerates, breccias, and the effects of microplastics on marine organisms Aimed at undergraduates in geology and earth science, *Sedimentary Petrology* is an excellent teaching and learning resource for introductory courses in sedimentary rocks.

Hydraulic Fracture Modeling - Yu-Shu Wu 2017-12-12
Hydraulic Fracture Modeling delivers all the pertinent technology and solutions in one product to become the go-to source for petroleum and reservoir engineers. Providing tools and approaches, this multi-contributed

reference presents current and upcoming developments for modeling rock fracturing including their limitations and problem-solving applications. Fractures are common in oil and gas reservoir formations, and with the ongoing increase in development of unconventional reservoirs, more petroleum engineers today need to know the latest technology surrounding hydraulic fracturing technology such as fracture rock modeling. There is tremendous research in the area but not all located in one place. Covering two types of modeling technologies, various effective fracturing approaches and model applications for fracturing, the book equips today's petroleum engineer with an all-inclusive product to characterize and optimize today's more complex reservoirs. Offers understanding of the details surrounding fracturing and fracture modeling technology, including theories and quantitative methods Provides academic and practical perspective from multiple contributors at the forefront of hydraulic fracturing and rock mechanics Provides today's petroleum engineer with model validation tools backed by real-world case studies

Unconventional Reservoir Geomechanics - Mark D. Zoback
2019-05-16

A comprehensive overview of the key geologic, geomechanical and engineering principles that govern the development of unconventional oil and gas reservoirs. Covering hydrocarbon-bearing formations, horizontal drilling, reservoir seismology and environmental impacts, this is an invaluable resource for geologists, geophysicists and reservoir engineers.

Unconventional Oil and Gas Resources Handbook - Y Zee Ma
2015-10-06

Unconventional Oil and Gas Resources Handbook: Evaluation and Development is a must-have, helpful

handbook that brings a wealth of information to engineers and geoscientists. Bridging between subsurface and production, the handbook provides engineers and geoscientists with effective methodology to better define resources and reservoirs. Better reservoir knowledge and innovative technologies are making unconventional resources economically possible, and multidisciplinary approaches in evaluating these resources are critical to successful development. Unconventional Oil and Gas Resources Handbook takes this approach, covering a wide range of topics for developing these resources including exploration, evaluation, drilling, completion, and production. Topics include theory, methodology, and case histories and will help to improve the understanding, integrated evaluation, and effective development of unconventional resources. Presents methods for a full development cycle of unconventional resources, from exploration through production Explores multidisciplinary integrations for evaluation and development of unconventional resources and covers a broad range of reservoir characterization methods and development scenarios Delivers balanced information with multiple contributors from both academia and industry Provides case histories involving geological analysis, geomechanical analysis, reservoir modeling, hydraulic fracturing treatment, microseismic monitoring, well performance and refracturing for development of unconventional reservoirs

Quantitative Seismic Interpretation - Per Avseth
2010-06-10

Quantitative Seismic Interpretation demonstrates how rock physics can be applied to predict reservoir parameters, such as lithologies and pore fluids, from seismically derived attributes. The authors provide an

integrated methodology and practical tools for quantitative interpretation, uncertainty assessment, and characterization of subsurface reservoirs using well-log and seismic data. They illustrate the advantages of these new methodologies, while providing advice about limitations of the methods and traditional pitfalls. This book is aimed at graduate students, academics and industry professionals working in the areas of petroleum geoscience and exploration seismology. It will also interest environmental geophysicists seeking a quantitative subsurface characterization from shallow seismic data. The book includes problem sets and a case-study, for which seismic and well-log data, and Matlab codes are provided on a website (<http://www.cambridge.org/9780521816014>). These resources will allow readers to gain a hands-on understanding of the methodologies.

Unconventional Shale Gas Development - Rouzbeh G. Moghanloo 2022-02-23

Unconventional Shale Gas Development: Lessons Learned gives engineers the latest research developments and practical applications in today's operations. Comprised of both academic and corporate contributors, a balanced critical review on technologies utilized are covered. Environmental topics are presented, including produced water management and sustainable operations in gas systems. Machine learning applications, well integrity and economic challenges are also covered to get the engineer up-to-speed. With its critical elements, case studies, history plot visuals and flow charts, the book delivers a critical reference to get today's petroleum engineers updated on the latest research and applications surrounding shale gas systems. Bridges the gap between the latest research developments and

practical applications through case studies and workflow charts Helps readers understand the latest developments from the balanced viewpoint of academic and corporate contributors Considers environmental and sustainable operations in shale gas systems, including produced water management

Geologic Fracture Mechanics - Richard A. Schultz
2019-08-08

Introduction to geologic fracture mechanics covering geologic structural discontinuities from theoretical and field-based perspectives.

Applications of Geotechnical Mechanics in Underground Engineering - Chaojun Jia 2022-10-17

Shale - Thomas Dewers 2019-09-16

Advances in theories, methods and applications for shale resource use Shale is the dominant rock in the sedimentary record. It is also the subject of increased interest because of the growing contribution of shale oil and gas to energy supplies, as well as the potential use of shale formations for carbon dioxide sequestration and nuclear waste storage. Shale: Subsurface Science and Engineering brings together geoscience and engineering to present the latest models, methods and applications for understanding and exploiting shale formations.

Volume highlights include: Review of current knowledge on shale geology Latest shale engineering methods such as horizontal drilling Reservoir management practices for optimized oil and gas field development Examples of economically and environmentally viable methods of hydrocarbon extraction from shale Discussion of issues relating to hydraulic fracking, carbon sequestration, and nuclear waste storage

Geological Carbon Storage - Stéphanie Vialle 2018-12-18

Geological Carbon Storage Subsurface Seals and Caprock Integrity Seals and caprocks are an essential component of subsurface hydrogeological systems, guiding the movement and entrapment of hydrocarbon and other fluids. Geological Carbon Storage: Subsurface Seals and Caprock Integrity offers a survey of the wealth of recent scientific work on caprock integrity with a focus on the geological controls of permanent and safe carbon dioxide storage, and the commercial deployment of geological carbon storage. Volume highlights include: Low-permeability rock characterization from the pore scale to the core scale Flow and transport properties of low-permeability rocks Fundamentals of fracture generation, self-healing, and permeability Coupled geochemical, transport and geomechanical processes in caprock Analysis of caprock behavior from natural analogues Geochemical and geophysical monitoring techniques of caprock failure and integrity Potential environmental impacts of carbon dioxide migration on groundwater resources Carbon dioxide leakage mitigation and remediation techniques Geological Carbon Storage: Subsurface Seals and Caprock Integrity is an invaluable resource for geoscientists from academic and research institutions with interests in energy and environment-related problems, as well as professionals in the field. Book Review: William R. Green, Patrick Taylor, Sven Treitel, and Moritz Flidner, (2020), "Reviews," The Leading Edge 39: 214–216 Geological Carbon Storage: Subsurface Seals and Caprock Integrity, edited by Stéphanie Vialle, Jonathan Ajo-Franklin, and J. William Carey, ISBN 978-1-119-11864-0, 2018, American Geophysical Union and Wiley, 364 p., US\$199.95 (print), US\$159.99 (eBook). This volume is a part of the AGU/Wiley Geophysical Monograph Series. The editors

assembled an international team of earth scientists who present a comprehensive approach to the major problem of placing unwanted and/or hazardous fluids beneath a cap rock seal to be impounded. The compact and informative preface depicts the nature of cap rocks and the problems that may occur over time or with a change in the formation of the cap rock. I have excerpted a quote from the preface that describes the scope of the volume in a concise and thorough matter. "Caprocks can be defined as a rock that prevents the flow of a given fluid at certain temperature, pressure, and chemical conditions. ... A fundamental understanding of these units and of their evolution over time in the context of subsurface carbon storage is still lacking." This volume describes the scope of current research being conducted on a global scale, with 31 of the 83 authors working outside of the United States. The studies vary but can be generalized as monitoring techniques for cap rock integrity and the consequence of the loss of that integrity. The preface ends by calling out important problems that remain to be answered. These include imaging cap rocks in situ, detecting subsurface leaks before they reach the surface, and remotely examining the state of the cap rock to avert any problems. Chapter 3 describes how newer methods are used to classify shale. These advanced techniques reveal previously unknown microscopic properties that complicate classification. This is an example of the more we know, the more we don't know. A sedimentologic study of the formation of shale (by far the major sedimentary rock and an important rock type) is described in Chapter 4. The authors use diagrammatic examples to illustrate how cap rocks may fail through imperfect seal between the drill and wall rock, capillary action, or a structural

defect (fault). Also, the shale pore structures vary in size, and this affects the reservoir. There are descriptions of the pore structure in the Eagle Ford and Marcellus shales and several others. Pore structures are analyzed using state-of-the-art ultra-small-angle X-ray or neutron scattering. They determine that the overall porosity decreases nonlinearly with time. There are examples of cap rock performance under an array of diagnostic laboratory analyses and geologic field examples (e.g., Marcellus Formation). The importance of the sequestration of CO₂ and other contaminants highlights the significance of this volume. The previous and following chapters illuminate the life history of the lithologic reservoir seal. I would like to call out Chapter 14 in which the authors illustrate the various mechanisms by which a seal can fail and Chapter 15 in which the authors address the general problems of the effect of CO₂ sequestration on the environment. They establish a field test, consisting of a trailer and large tank of fluids with numerous monitoring instruments to replicate the effect of a controlled release of CO₂-saturated water into a shallow aquifer. This chapter's extensive list of references will be of interest to petroleum engineers, rock mechanics, and environmentalists. The authors of this volume present a broad view of the underground storage of CO₂. Nuclear waste and hydrocarbons are also considered for underground storage. There are laboratory, field, and in situ studies covering nearly all aspects of this problem. I cannot remember a study in which so many different earth science resources were applied to a single problem. The span of subjects varies from traditional geochemical analysis with the standard and latest methods in infrared and X-ray techniques,

chemical and petroleum engineering, sedimentary mineralogy, hydrology, and geomechanical studies. This volume is essential to anyone working in this field as it brings several disciplines together to produce a comprehensive study of carbon sequestration. While the volume is well illustrated, there is a lack of color figures. Each chapter should have at least two color figures, or there should be several pages of color figures bound in the center of the volume. Many of the figures would be more meaningful if they had been rendered in color. Also, the acronyms are defined in the individual chapters, but it would be helpful to have a list of acronyms after the extensive index. I recommend this monograph to all earth scientists but especially petroleum engineers, structural geologists, mineralogists, and environmental scientists. Since these chapters cover a broad range of studies, it would be best if the reader has a broad background. – Patrick Taylor Davidsonville, Maryland

Physical Properties of Rocks - Jürgen Schön 2011-08-02
A symbiosis of a brief description of physical fundamentals of the rock properties (based on typical experimental results and relevant theories and models) with a guide for practical use of different theoretical concepts.

Muds and Mudstones - Andrew C. Aplin 1999

Fundamentals of Gas Shale Reservoirs - Reza Rezaee
2015-07-01

Provides comprehensive information about the key exploration, development and optimization concepts required for gas shale reservoirs Includes statistics about gas shale resources and countries that have shale gas potential Addresses the challenges that oil and gas

industries may confront for gas shale reservoir exploration and development Introduces petrophysical analysis, rock physics, geomechanics and passive seismic methods for gas shale plays Details shale gas environmental issues and challenges, economic consideration for gas shale reservoirs Includes case studies of major producing gas shale formations
The Rock Physics Handbook - Gary Mavko 2020-01-09
Brings together widely scattered theoretical and laboratory rock physics relations critical for modelling and interpretation of geophysical data.

Petrophysics - 2001

Core Analysis - Colin McPhee 2015-12-10

Core Analysis: A Best Practice Guide is a practical guide to the design of core analysis programs. Written to address the need for an updated set of recommended practices covering special core analysis and geomechanics tests, the book also provides unique insights into data quality control diagnosis and data utilization in reservoir models. The book's best practices and procedures benefit petrophysicists, geoscientists, reservoir engineers, and production engineers, who will find useful information on core data in reservoir static and dynamic models. It provides a solid understanding of the core analysis procedures and methods used by commercial laboratories, the details of lab data reporting required to create quality control tests, and the diagnostic plots and protocols that can be used to identify suspect or erroneous data. Provides a practical overview of core analysis, from coring at the well site to laboratory data acquisition and interpretation Defines current best practice in core analysis preparation and test procedures, and the

diagnostic tools used to quality control core data Provides essential information on design of core analysis programs and to judge the quality and reliability of core analysis data ultimately used in reservoir evaluation Of specific interest to those working in core analysis, porosity, relative permeability, and geomechanics

Reservoir Geomechanics - Mark D. Zoback 2010-04-01

This interdisciplinary book encompasses the fields of rock mechanics, structural geology and petroleum engineering to address a wide range of geomechanical problems that arise during the exploitation of oil and gas reservoirs. It considers key practical issues such as prediction of pore pressure, estimation of hydrocarbon column heights and fault seal potential, determination of optimally stable well trajectories, casing set points and mud weights, changes in reservoir performance during depletion, and production-induced faulting and subsidence. The book establishes the basic principles involved before introducing practical measurement and experimental techniques to improve recovery and reduce exploitation costs. It illustrates their successful application through case studies taken from oil and gas fields around the world. This book is a practical reference for geoscientists and engineers in the petroleum and geothermal industries, and for research scientists interested in stress measurements and their application to problems of faulting and fluid flow in the crust.

Guidelines for Open Pit Slope Design in Weak Rocks - Derek Martin 2018-01-10

Weak rocks encountered in open pit mines cover a wide variety of materials, with properties ranging between soil and rock. As such, they can provide a significant

challenge for the slope designer. For these materials, the mass strength can be the primary control in the design of the pit slopes, although structures can also play an important role. Because of the typically weak nature of the materials, groundwater and surface water can also have a controlling influence on stability. *Guidelines for Open Pit Slope Design in Weak Rocks* is a companion to *Guidelines for Open Pit Slope Design*, which was published in 2009 and dealt primarily with strong rocks. Both books were commissioned under the Large Open Pit (LOP) project, which is sponsored by major mining companies. These books provide summaries of the current state of practice for the design, implementation and assessment of slopes in open pits, with a view to meeting the requirements of safety, as well as the recovery of anticipated ore reserves. This book, which follows the general cycle of the slope design process for open pits, contains 12 chapters. These chapters were compiled and written by industry experts and contain a large number of case histories. The initial chapters address field data collection, the critical aspects of determining the strength of weak rocks, the role of groundwater in weak rock slope stability and slope design considerations, which can differ somewhat from those applied to strong rock. The subsequent chapters address the principal weak rock types that are encountered in open pit mines, including cemented colluvial sediments, weak sedimentary mudstone rocks, soft coals and chalk, weak limestone, saprolite, soft iron ores and other leached rocks, and hydrothermally altered rocks. A final chapter deals with design implementation aspects, including mine planning, monitoring, surface water control and closure of weak rock slopes. As with the other books in this series,

Guidelines for Open Pit Slope Design in Weak Rocks provides guidance to practitioners involved in the design and implementation of open pit slopes, particularly geotechnical engineers, mining engineers, geologists and other personnel working at operating mines.

Geomechanical and Petrophysical Properties of Mudrocks - E.H. Rutter 2017-10-09

A surge of interest in the geomechanical and petrophysical properties of mudrocks (shales) has taken place in recent years following the development of a shale gas industry in the United States and elsewhere, and with the prospect of similar developments in the UK. Also, these rocks are of particular importance in excavation and construction geotechnics and other rock engineering applications, such as underground natural gas storage, carbon dioxide disposal and radioactive waste storage. They may greatly influence the stability of natural and engineered slopes. Mudrocks, which make up almost three-quarters of all the sedimentary rocks on Earth, therefore impact on many areas of applied geoscience. This volume focuses on the mechanical behaviour and various physical properties of mudrocks. The 15 chapters are grouped into three themes: (i) physical properties such as porosity, permeability, fluid flow through cracks, strength and geotechnical behaviour; (ii) mineralogy and microstructure, which control geomechanical behaviour; and (iii) fracture, both in laboratory studies and in the field.

Seismic Petrophysics in Quantitative Interpretation - Lev Vernik 2016-10-15

Exploration and characterization of conventional and unconventional reservoirs using seismic technologies are among the main activities of upstream technology groups

and business units of oil and gas operators. However, these activities frequently encounter difficulties in quantitative seismic interpretation due to remaining confusion and new challenges in the fast developing field of seismic petrophysics. *Seismic Petrophysics in Quantitative Interpretation* shows how seismic interpretation can be made simple and robust by integration of the rock physics principles with seismic and petrophysical attributes bearing on the properties of both conventional (thickness, net/gross, lithology, porosity, permeability, and saturation) and unconventional (thickness, lithology, organic richness, thermal maturity) reservoirs. Practical solutions to existing interpretation problems in rock physics-based amplitude versus offset (AVO) analysis and inversion are addressed in the book to streamline the workflows in subsurface characterization. Although the book is aimed at oil and gas industry professionals and academics concerned with utilization of seismic data in petroleum exploration and production, it could also prove helpful for geotechnical and completion engineers and drillers seeking to better understand how seismic and sonic data can be more thoroughly utilized.

Sedimentary Petrology - Maurice E. Tucker 2023-04-24
Authoritative, accessible, and updated introduction to sedimentary rocks for undergraduate students *Sedimentary Petrology* provides readers with a concise account of sedimentary rock composition, mineralogy, texture, structure, diagenesis, and depositional environments. The new edition of this classic text incorporates the many technological and analytical advances of the last decade, revealing exciting details of processes such as microbial precipitation, how microporosity is created within mudrocks, and the chemical composition of

foraminifera deposits, which can be a key indicator for changing seawater temperature. This fourth edition offers a comprehensive update and expansion of the previous editions with a new set of illustrations, new references, and further reading. The new co-author Stuart Jones has brought his considerable expertise in clastic sedimentology to the rewritten chapters on sandstones and mudrocks. The addition of color images throughout the text will aid students immensely in their studies and petrographic fieldwork. Sample topics covered in Sedimentary Petrology include: Advances in modeling and programming to simulate depositional-diagenetic conditions and controls which support field-lab descriptions and interpretations Ocean acidification and the demise of coral reefs, and the role of the oceans in carbon capture and storage Sedimentary ironstones and iron-formations, sedimentary phosphate deposits, coal, oil shale and petroleum, and cherts and siliceous sediments Limestones, evaporites, volcanoclastic sediments, sandstones, conglomerates, breccias, and the effects of microplastics on marine organisms Aimed at undergraduates in geology and earth science, Sedimentary Petrology is an excellent teaching and learning resource for introductory courses in sedimentary rocks.

ICIPEG 2016 - Mariyamni Awang 2017-01-20

This book presents the proceedings of the 4th International Conference on Integrated Petroleum Engineering and Geosciences 2016 (ICIPEG 2016), held under the banner of World Engineering, Science & Technology Congress (ESTCON 2016) at Kuala Lumpur Convention Centre from August 15 to 17, 2016. It presents peer-reviewed research articles on exploration, while also exploring a new area: shale research. In this

time of low oil prices, it highlights findings to maintain the exchange of knowledge between researchers, serving as a vital bridge-builder between engineers, geoscientists, academics, and industry.

Reservoir Characterization - Larry Lake 2012-12-02

Reservoir Characterization is a collection of papers presented at the Reservoir Characterization Technical Conference, held at the Westin Hotel-Galleria in Dallas on April 29-May 1, 1985. Conference held April 29-May 1, 1985, at the Westin Hotel-Galleria in Dallas. The conference was sponsored by the National Institute for Petroleum and Energy Research, Bartlesville, Oklahoma. Reservoir characterization is a process for quantitatively assigning reservoir properties, recognizing geologic information and uncertainties in spatial variability. This book contains 19 chapters, and begins with the geological characterization of sandstone reservoir, followed by the geological prediction of shale distribution within the Prudhoe Bay field. The subsequent chapters are devoted to determination of reservoir properties, such as porosity, mineral occurrence, and permeability variation estimation. The discussion then shifts to the utility of a Bayesian-type formalism to delineate qualitative "soft" information and expert interpretation of reservoir description data. This topic is followed by papers concerning reservoir simulation, parameter assignment, and method of calculation of wetting phase relative permeability. This text also deals with the role of discontinuous vertical flow barriers in reservoir engineering. The last chapters focus on the effect of reservoir heterogeneity on oil reservoir. Petroleum engineers, scientists, and researchers will find this book of great value.

Rock Physics and Geofluid Detection - Jing Ba 2021-10-29

Geomechanics and Geology - J.P. Turner 2017-09-19

Geomechanics investigates the origin, magnitude and deformational consequences of stresses in the crust. In recent years awareness of geomechanical processes has been heightened by societal debates on fracking, human-induced seismicity, natural geohazards and safety issues with respect to petroleum exploration drilling, carbon sequestration and radioactive waste disposal. This volume explores the common ground linking geomechanics with inter alia economic and petroleum geology, structural geology, petrophysics, seismology, geotechnics, reservoir engineering and production technology. Geomechanics is a rapidly developing field that brings together a broad range of subsurface professionals seeking to use their expertise to solve current challenges in applied and fundamental geoscience. A rich diversity of case studies herein showcase applications of geomechanics to hydrocarbon exploration and field development, natural and artificial geohazards, reservoir stimulation, contemporary tectonics and subsurface fluid flow. These papers provide a representative snapshot of the exciting state of geomechanics and establish it firmly as a flourishing subdiscipline of geology that merits broadest exposure across the academic and corporate geosciences.

Fundamentals of Gas Shale Reservoirs - Reza Rezaee
2015-07-01

Provides comprehensive information about the key exploration, development and optimization concepts required for gas shale reservoirs Includes statistics about gas shale resources and countries that have shale gas potential Addresses the challenges that oil and gas industries may confront for gas shale reservoir

exploration and development Introduces petrophysical analysis, rock physics, geomechanics and passive seismic methods for gas shale plays Details shale gas environmental issues and challenges, economic consideration for gas shale reservoirs Includes case studies of major producing gas shale formations

Sustainable Geoscience for Natural Gas SubSurface Systems - David A. Wood 2021-10-30

Sustainable Geoscience for Natural Gas SubSurface Systems delivers many of the scientific fundamentals needed in the natural gas industry, including coal-seam gas reservoir characterization and fracture analysis modeling for shale and tight gas reservoirs. Advanced research includes machine learning applications for well log and facies analysis, 3D gas property geological modeling, and X-ray CT scanning to reduce environmental hazards. Supported by corporate and academic contributors, along with two well-distinguished editors, the book gives today's natural gas engineers both fundamentals and advances in a convenient resource, with a zero-carbon future in mind. Includes structured case studies to illustrate how new principles can be applied in practical situations Helps readers understand advanced topics, including machine learning applications to optimize predictions, controls and improve knowledge-based applications Provides tactics to accelerate emission reductions Teaches gas fracturing mechanics aimed at reducing environmental impacts, along with enhanced oil recovery technologies that capture carbon dioxide

Shale Reservoirs - John Breyer 2012-08-20

Hardcover plus CD

Application of Analytical Techniques to Petroleum Systems - P. Dowey 2020-11-10

Cutting-edge techniques have always been utilized in petroleum exploration and production to reduce costs and improve efficiencies. The demand for petroleum in the form of oil and gas is expected to increase for electricity production, transport and chemical production, largely driven by an increase in energy consumption in the developing world. Innovations in analytical methods will continue to play a key role in the industry moving forwards as society shifts towards lower carbon energy systems and more advantaged oil and gas resources are targeted. This volume brings together new analytical approaches and describes how they can be applied to the study of petroleum systems. The papers within this volume cover a wide range of topics and case studies, in the fields of fluid and isotope geochemistry, organic geochemistry, imaging and sediment provenance. The work illustrates how the current, state-of-the-art technology can be effectively utilised to address ongoing challenges in petroleum geoscience.

Unconventional Hydrocarbon Resources - Reza Barati
2020-12-03

A comprehensive textbook presenting techniques for the analysis and characterization of shale plays. Significant reserves of hydrocarbons cannot be extracted using conventional methods. Improvements in techniques such as horizontal drilling and hydraulic fracturing have increased access to unconventional hydrocarbon resources, ushering in the "shale boom" and disrupting the energy sector. *Unconventional Hydrocarbon Resources: Techniques for Reservoir Engineering Analysis* covers the geochemistry, petrophysics, geomechanics, and economics of unconventional shale oil plays. The text uses a step-by-step approach to demonstrate industry-standard workflows for calculating resource volume and optimizing

the extraction process. Volume highlights include: Methods for rock and fluid characterization of unconventional shale plays A workflow for analyzing wells with stimulated reservoir volume regions An unconventional approach to understanding of fluid flow through porous media A comprehensive summary of discoveries of massive shale resources worldwide Data from Eagle Ford, Woodford, Wolfcamp, and The Bakken shale plays Examples, homework assignments, projects, and access to supplementary online resources Hands-on teaching materials for use in petroleum engineering software applications The American Geophysical Union promotes discovery in Earth and space science for the benefit of humanity. Its publications disseminate scientific knowledge and provide resources for researchers, students, and professionals.

Petroleum Geoscience - Knut Bjørlykke 2015-05-19

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.

Transport in Shale Reservoirs - Kun Sang Lee 2019-02-20
Transport in Shale Reservoirs fills the need for a necessary, integrative approach on shale reservoirs. It delivers both the fundamental theories of transport in shale reservoirs and the most recent advancements in the recovery of shale oil and gas in one convenient

reference. Shale reservoirs have distinctive features dissimilar to those of conventional reservoirs, thus an accurate evaluation on the behavior of shale gas reservoirs requires an integrated understanding on their characteristics and the transport of reservoir and fluids. Updates on the various transport mechanisms in shale, such as molecular diffusion and phase behavior in nano-pores Applies theory to practice through simulation in both shale oil and gas Presents an up-to-date reference on remaining challenges, such as organic material in the shale simulation and multicomponent transport in CO2 injection processes

Effect of CEC, Salinity, Mineralogy, Sand Content, and Particle Size Distribution on Mud Rock Properties - Mohab Dessouki 2015

Mudrocks are fine grained, extremely low porosity and permeability sedimentary rocks that contain significant amounts of clay minerals. These rocks are difficult to characterize their physical properties or test their mechanical behavior. Clay's cation exchange capacity (CEC) make these rocks water sensitive due to double layer expansion or collapse. Conductometric titration and methylene blue colorimetry were used to measure CEC and compared to cobalt hexamine technique values provided by a vendor. In this work, we studied petrophysical and geomechanical properties of resedimented mudrock core samples. Three major properties were varied; they are clay's percentage, cation Exchange capacity and brine salinity. The use of the reconsolidation technique allows us to create mud rocks in the laboratory while controlling mineralogy, sorting, brine salinity, and axial stress, this is similar to sand pack experiments performed by (Hathon & Myers, 2011) which showed that mineralogy, grain size,

sorting, stress history and incipient overgrowth cements all affect the porosity as a function of depletion stress. Triaxial testing is commonly used to determine the failure envelope for mudrocks. The most common application of this technique requires multiple identical samples. In heterogeneous formation identical samples are often difficult to obtain. The twinning problem is overcome by performing 'multistage' tri-axial tests. These tests were performed on reconsolidated mud rocks to determine their strength properties (Salman, Myers, & Sharf Aldin, 2015). Strength data are compared based on the sample's variations such as CEC, brine salinity, and clay content.

Soft Rock Mechanics and Engineering - Milton Kanji 2019-11-24

This book offers a practical reference guide to soft rock mechanics for engineers and scientists. Written by recognized experts, it will benefit professionals, contractors, academics, researchers and students working on rock engineering projects in the fields of civil engineering, mining and construction engineering. Soft Rock Mechanics and Engineering covers a specific subject of great relevance in Rock Mechanics – and one that is directly connected to the design of geotechnical structures under difficult ground conditions. The book addresses practical issues related to the geomechanical properties of these types of rock masses and their characterization, while also discussing advances regarding in situ investigation, safety, and monitoring of geotechnical structures in soft rocks. Lastly, it presents important case histories involving tunnelling, dam foundations, coal and open pit mines and landslides. *Subseismic-Scale Reservoir Deformation* - M. Ashton 2018-01-02

In the current cost-constrained environment for hydrocarbon exploitation, increasing emphasis is being placed on robust subsurface description and a clear understanding of the range of uncertainty associated with reservoir models. Structural heterogeneity, particularly at the subseismic scale, forms an integral part of these refined descriptions as it allows greater prediction of subsurface flow characteristics. This volume examines the best current practice and new challenges in hydrocarbon reservoir characterization and modelling of small to subseismic deformation features through case studies, experimental results and

modelling. The papers follow four themes: characterization of deformation in porous sandstones, novel characterization techniques, quantifying and characterizing deformation in carbonates, and modelling small-scale features. It includes a collection of papers from a two-day international conference that brought academic and industry geoscientists and engineers together to discuss best current practice and new challenges in reservoir characterization and modelling of small to subseismic deformation features. The volume should be of interest to geoscientists, petrophysicists, reservoir engineers and modellers.