

Encyclopedic Dictionary Of Exploration Geophysics Geophysical References Series Vol 1

?: Encyclopedic dictionary of exploration geophysics/R. E. Sheriff. -- 2nd ed, 1986

Covers the basic ideas and methods used in seismic processing, concentrating on the fundamentals of seismic imaging and deconvolution. Many of the seismic methods in popular use today go back to the work of some of the great scientists of past centuries. The ideas are developed from the ground up. Most chapters in the book are followed by problem sets. Some exercises are designed to supplement the material presented in the text; others are meant to stimulate classroom discussions. There are few industrial-grade illustrations. Instead, both the text and the exercises deal mostly with simple examples that often can be solved with nothing more than a pencil and paper. Each chapter is as self-contained as possible to make it easier for a reader to concentrate on topics of particular interest. The book covers such basic topics as wave motion; digital imaging; digital filtering; various visualization aspects of the seismic reflection method; sampling theory; the frequency spectrum; synthetic seismograms; wavelets and wavelet processing; deconvolution; the need for continuing interaction between the seismic interpreter and the computer; seismic attributes; phase rotation; and seismic attenuation. The last of the 15 chapters gives a detailed mathematical overview. Digital Imaging and Deconvolution, nominated for the Association of Earth Science Editors award for the best geoscience publication of 2008-2009, will be of interest to professional geophysicists as well as graduate students and upper-level undergraduates in geophysics. The book also will be helpful to scientists and engineers in other disciplines who use digital signal processing to analyze and image wave-motion data in remote-detection applications. In particular, the methods described in this book are important in optical imaging, video imaging, medical and biological imaging, acoustical analysis, radar, and sonar.

This book introduces readers to seismic inversion methods and their application to both synthetic and real seismic data sets. Seismic inversion methods are routinely used to estimate attributes like P-impedance, S-impedance, density, the ratio of P-wave and S-wave velocities and elastic impedances from seismic and well log data. These attributes help to understand lithology and fluid contents in the subsurface. There are several seismic inversion methods available, but their application and results differ considerably, which can lead to confusion. This book explains all popular inversion methods, discusses their mathematical backgrounds, and demonstrates their capacity to extract information from seismic reflection data. The types covered include model-based inversion, colored inversion, sparse spike inversion, band-limited inversion, simultaneous inversion, elastic impedance inversion and geostatistical inversion, which includes single-attribute analysis, multi-attribute analysis, probabilistic neural networks and multi-layer feed-forward neural networks. In addition, the book describes local and global optimization methods and their application to seismic reflection data. Given its multidisciplinary, integrated and practical approach, the book offers a valuable tool for students and young professionals, especially those affiliated with oil companies.

Developments in Economic Geology, 5: Principles of Induced Polarization for Geophysical Exploration focuses on the principles, methodologies, and approaches involved in induced polarization (IP), including anisotropism, electromagnetic coupling, and electrical circuits. The book first takes a look at resistivity principles, theory of IP, and laboratory work in IP. Concerns cover electrical measurements of rocks, anisotropism, early part of decay curve and the comparison with frequency effects, electrical models of induced polarization, electrical polarization, resistivities of earth materials, and resistivity exploration methods. The manuscript then elaborates on IP field equipment, telluric noise and electromagnetic coupling, IP field surveying, and drill-hole and underground surveying and the negative IP effect. Discussions focus on differences between surface and subsurface methods, current-sending system in the field, telluric (earth) currents, electromagnetic coupling, design considerations, coupling of electrical circuits, design considerations, and signal-generating system. The manuscript ponders on the complex-resistivity method and interpretation of induced-polarization data, including grade estimation of mineralization using the IP method, complex-resistivity survey, signal detection capabilities of the complex-resistivity method, and disadvantages of the complex-resistivity method. The text is a valuable source of information for researchers wanting to study induced polarization.

The fifth edition of the Glossary of Geology contains nearly 40,000 entries, including 3,600 new terms and nearly 13,000 entries with revised definitions from the previous edition. In addition to definitions, many entries include background information and aids to syllabication. The Glossary draws its authority from the expertise of more than 100 geoscientists in many specialties who reviewed definitions and added new terms.

This book presents the essential principles and applications of seismic oil-exploration techniques. It concisely covers all stages in exploration activities (data field acquisition, data processing and interpretation), supplementing the main text with a wealth of (>350) illustrations and figures. The book concentrates on the physics of the applied principles, avoiding intricate mathematical treatment and lengthy theoretical reasoning. A further prominent feature is the inclusion of a separate chapter on 3D surveying techniques and another, equally important chapter on seismic digital signals and the aliasing problem, which is presented in an accessible form. The book is designed to meet the needs of both the academic and industrial worlds. University students and employees of oil-exploration companies alike will find the book to be a valuable resource.

Geophysics, the excellent exploration tool which traditionally uses the latest techniques has been in great demand, and has assisted by remarkable development of the methods which consist of gravimetry, electromagnetics and, the most important, seismic reflection. The book is presented like an encyclopedia. One may find an exact definition, illustrated with simple sketches, precise formulae & orders of magnitude & data which have so often been missing.

The efficient mining of hard coal in deep coal mines using highly mechanized longwall techniques requires information on the geological structure ahead of the operating face.

Even minor tectonic faults with throws of only a few metres mean a loss in productivity, as they present severe working problems for underground mining equipment. Because investment costs to install a mechanized face are high, "insurance" in the form of spare capacity by both machine shifts or spare faces is uneconomic. Thus, to reduce mining costs it is essential to delineate the geology prior to mining. Today, the only effective geophysical tool to detect and to map minor faults in front of the coal cutter is in-seam seismics using channel, or so called seam waves. The techniques are well established and successfully applied for more than two decades. In-Seam Seismics covers the entire range of elementary and advanced topics in mathematics, physics and data processing of dispersive channel waves. The results of analogue and numerical modelling provide a thorough understanding of transmission, reflection, recording and interpretation of seam waves and coal seam disturbances. Fire damp proof instrumentation, target orientated underground layouts, processing and interpretation of real data impart the state-of-the-art of in-seam seismics. Selected and well-rounded case histories complete the presentation of in-seam seismics. They can help the mining engineer to come to a decision to plan and to apply in-seam seismics in case of underground mining problems. A clear text, only formulae which are necessary, many carefully designed figures, an extended list of references and a lucid index make it easy for the reader to get acquainted with seam waves or to promote the technique of in-seam seismics.

Provides information on where to go to find detailed guidance on how to use these techniques. Covers: remote sensing & surface geophysical methods; drilling & solids sampling methods; geophysical logging of boreholes; aquifer test methods; ground water sampling methods; Vadose Zone (VZ) hydrologic properties: water state, infiltration, conductivity, & flux; VZ water budget characterization methods; VZ soil-solute/gas sampling & monitoring methods; & chemical field screening & analytical methods. Charts, tables, graphs & drawings.

This is the completely updated revision of the highly regarded book Exploration Seismology. Available now in one volume, this textbook provides a complete and systematic discussion of exploration seismology. The first part of the book looks at the history of exploration seismology and the theory - developed from the first principles of physics. All aspects of seismic acquisition are then described. The second part of the book goes on to discuss data-processing and interpretation. Applications of seismic exploration to groundwater, environmental and reservoir geophysics are also included. The book is designed to give a comprehensive up-to-date picture of the applications of seismology. Exploration Seismology's comprehensiveness makes it suitable as a text for undergraduate courses for geologists, geophysicists and engineers, as well as a guide and reference work for practising professionals.

These proceedings consist of papers presented at a Bureau of Mines Technology Transfer Seminar in September 1981 for the purpose of disseminating recent advances in mining technology in the area of premining research. The introduction and descriptive papers discuss techniques and instrumentation used in premining research for metal and nonmetal mining and shaft design and borehole control for premine planning.

Geophysics in the Affairs of Man: A Personalized History of Exploration Geophysics and its Allied Sciences of Seismology and Oceanography describes many of the key and intriguing developments which took place within several major fields of geophysics. This book is composed of nine chapters that focus on the geophysical enterprise as an interplay of technical, social, and economic factors. After a brief overview of geophysics activity before the World War I, this book goes on the period of the so-called "golden days" of exploration geophysics. The succeeding chapter deals with the exploration geophysics during the global war, particularly the classical seismological activity during this time. These topics are followed by discussions of the geophysical activities from 1945 to 1960, as well as the introduction of oceanography field. Other chapters cover the interaction between geophysics and ecology, as well as OPEC during the period of 1970s and early 1980s. The final chapters consider the status and nature of geophysical exploration industry. This book will prove useful to geophysicists, historians, and researchers in the allied fields.

This is the completely revised and updated version of the popular and highly regarded textbook, Applied Geophysics. It describes the physical methods involved in exploration for hydrocarbons and minerals, which include gravity, magnetic, seismic, electrical, electromagnetic, radioactivity, and well-logging methods. All aspects of these methods are described, including basic theory, field equipment, techniques of data acquisition, data processing and interpretation, with the objective of locating commercial deposits of minerals, oil, and gas and determining their extent. In the fourteen years or so since the first edition of Applied Geophysics, many changes have taken place in this field, mainly as the result of new techniques, better instrumentation, and increased use of computers in the field and in the interpretation of data. The authors describe these changes in considerable detail, including improved methods of solving the inverse problem, specialized seismic methods, magnetotellurics as a practical exploration method, time-domain electromagnetic methods, increased use of gamma-ray spectrometers, and improved well-logging methods and interpretation.

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This reference encompasses the fields of Geomagnetism and Paleomagnetism in a single volume. Both sciences have applications in navigation, in the search for minerals and hydrocarbons, in dating rock sequences, and in unraveling past geologic movements such as plate motions they have contributed to a better understanding of the Earth. The book describes in fine detail the current state of knowledge and provides an up-to-date synthesis of the most basic concepts. It is an indispensable working tool not only for geophysicists and geophysics students but also for geologists, physicists, atmospheric and environmental scientists, and engineers.

The twelve years since the third edition manuscript was finished have seen many new developments. Using seismic data for hydrocarbon production decisions has become almost routine. Visualization has become important in helping us better understand relationships. We now realize that most of what we formerly considered noise is actually geologic signal that we did not understand. We combine and interpret attributes and try to relate them to physical properties. AVO has become routine. We are beginning to quantify the anisotropic aspects of the real world. Multicomponent recording and interpretation of converted waves have proven their value in a number of situations. Downhole digitization of well logs has enormously increased the fidelity and amount of data about subsurface conditions. Recognition of hazards by noninvasive methods is growing. Our vocabulary has expanded because of geostatistics, neural networks, anisotropy, tomography, horizontal drilling, multicomponent acquisition, deep-water work, etc. These factors have all contributed to increasing our vocabulary.

This combination of textbook and reference manual provides a comprehensive account of gravity and magnetic methods for exploring the subsurface using surface, marine, airborne and satellite measurements. It describes key current topics and techniques, physical properties of rocks and other earth materials, and digital data analysis methods used to process and interpret anomalies for subsurface information. Each chapter starts with an overview and concludes by listing key concepts to consolidate new learning. An accompanying website presents problem sets and interactive computer-based exercises, providing hands-on experience of processing, modeling and interpreting data. A comprehensive online suite of full-color case histories illustrates the practical utility of modern gravity and magnetic surveys. This is an ideal text for advanced undergraduate and graduate courses and reference text for research academics and professional geophysicists. It is a valuable resource for all those interested in petroleum, engineering, mineral, environmental, geological and archeological exploration of the lithosphere.

Many text books have been written on the subject "Exploration Geophysics". The majority of these texts focus on the theory and the mathematical treatment of the subject matter but lack treatment of practical aspects of geophysical exploration. This text is written in simple English to explain the physical meaning of jargon, or terms used in the industry. It describes how seismic data is acquired in 2-D and 3-D, how they are processed to convert the raw data to seismic vertical and horizontal cross sections, that are geologically meaningful, and how these and other data are interpreted to delineate a prospect. Workshops are included after each chapter and are designed to reinforce learning of the concepts presented. Key Features: Written in simple easy to understand language Heavily illustrated to aid in understanding the text End of chapter "Key words and workshop" The text includes several appendices and answers for the selected workshop problems

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 controlling 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 integrated 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 inversion techniques, AVO and seismic attributes analysis.

... Describes results of seismic and resistivity surface geophysical surveys that were conducted at 3 sites and borehole radar surveys conducted in 3 wells; directions of fracturing at each site are described; report also includes description of surface radar surveys, and geophysical surveys ...

This dictionary includes a number of mathematical, statistical and computing terms and their definitions to assist geoscientists and provide guidance on the methods and terminology encountered in the literature. Each technical term used in the explanations can be found in the dictionary which also includes explanations of basics, such as trigonometric functions and logarithms. There are also citations from the relevant literature to show the term's first use in mathematics, statistics, etc. and its subsequent usage in geosciences.

"This book examines the evolution of geophysical methods for exploring sedimentary basins by describing the internal structure and the nature of the formations found in such basins. The applicability of non-seismic methods is defined together with the conditions for their use. The seismic reflection method is fully described, distinguishing between the basic methods for handling routine problems and their adaptation to more specific or complex problems. The author then finally covers the emerging techniques of the future. Each fully illustrated chapter is a complete topic, easy to read with the mathematical derivations banished to the appendices." - back cover.

As of 1999, surface water collected and stored in reservoirs is the sole source of municipal water for the city of Williams . During 1996 and 1999, reservoirs reached historically low levels. Understanding the

ground-water flow system is critical to managing the ground-water resources in this part of the Coconino Plateau. The nearly 1,000-meter-deep regional aquifer in the Redwall and Muav Limestones, however, makes studying or utilizing the resource difficult. Near-vertical faults and complex geologic structures control the ground-water flow system on the southwest side of the Kaibab Uplift near Williams, Arizona. To address the hydrogeologic complexities in the study area, a suite of techniques, which included aeromagnetic, gravity, square-array resistivity, and audiomagnetotelluric surveys, were applied as part of a regional study near Bill Williams Mountain.

A synthesis of years of interdisciplinary research and practice, the second edition of this bestseller continues to serve as a primary resource for information on the assessment, remediation, and control of contamination on and below the ground surface. *Practical Handbook of Soil, Vadose Zone, and Ground-Water Contamination: Assessment, Prevention, and Remediation, Second Edition* includes important new developments in site characterization and soil and ground water remediation that have appeared since 1995. Presented in an easy-to-read style, this book serves as a comprehensive guide for conducting complex site investigations and identifying methods for effective soil and ground water cleanup. Remediation engineers, ground water and soil scientists, regulatory personnel, researchers, and field investigators can access the latest data and summary tables to illustrate key advantages and disadvantages of various remediation methods.

This new edition of the well-established Kearey and Brooks text is fully updated to reflect the important developments in geophysical methods since the production of the previous edition. The broad scope of previous editions is maintained, with even greater clarity of explanations from the revised text and extensively revised figures. Each of the major geophysical methods is treated systematically developing the theory behind the method and detailing the instrumentation, field data acquisition techniques, data processing and interpretation methods. The practical application of each method to such diverse exploration applications as petroleum, groundwater, engineering, environmental and forensic is shown by case histories. The mathematics required in order to understand the text is purposely kept to a minimum, so the book is suitable for courses taken in geophysics by all undergraduate students. It will also be of use to postgraduate students who might wish to include geophysics in their studies and to all professional geologists who wish to discover the breadth of the subject in connection with their own work.

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