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**SEG eBooks Collection:** Catalog numbers for e-books typically are the print catalog number followed by an “E” instead of an “A.” For example, Seismic Data Analysis is 112A for print and 112E for the e-book version. E-books can be accessed directly by entering the URL listed in the book description. The URL contains the e-book’s digital object identifier (DOI). Individuals may purchase and download recent and legacy titles by chapter or whole book. Institutions may contact subscriptions@seg.org for information about purchasing perpetual access to individual titles or the collection or subscribing to the collection.
Seismic Inversion
Gerard T. Schuster

Seismic Inversion describes the theory and practice of inverting seismic data for the subsurface rock properties of the earth. The primary application is for inverting reflection and/or transmission data from engineering or exploration surveys, but the methods described also can be used for earthquake studies. Seismic Inversion will be of benefit to scientists and advanced students in engineering, earth sciences, and physics. It is desirable that the reader has some familiarity with certain aspects of numerical computation, such as finite-difference solutions to partial differential equations, numerical linear algebra, and the basic physics of wave propagation. For those not familiar with the terminology and methods of seismic exploration, a brief introduction is provided. To truly understand the nuances of seismic inversion, we have to actively practice what we preach (or teach). Therefore, computational labs are provided. To truly understand the nuances of seismic inversion, we have to actively practice what we preach (or teach). Therefore, computational labs are provided. To truly understand the nuances of seismic inversion, we have to actively practice what we preach (or teach). Therefore, computational labs are provided. To truly understand the nuances of seismic inversion, we have to actively practice what we preach (or teach). Therefore, computational labs are provided.
Engineering Seismology with Applications to Geotechnical Engineering

Öz Yilmaz

The scope of engineering seismology includes geotechnical site investigations for buildings and engineering infrastructures, such as dams, levees, bridges, and tunnels, landslide and active-fault investigations, seismic microzonation, and geophysical investigations of historic buildings. These projects require multidisciplinary participation by the geologist, geophysicist, and geotechnical and earthquake engineers. A key objective of this book (SEG Investigations in Geophysics Series No. 17) by Öz Yilmaz is to encourage the specialists from these disciplines to apply the seismic method to solve the many challenging engineering problems they face. The broader scope of engineering seismology also includes exploration of earth resources, including groundwater exploration, coal and mineral exploration, and geothermal exploration. While focusing on the application of the seismic method to geotechnical site investigations, this book includes many case studies in all of the applications of engineering seismology.

Catalog #120A Published 2015, 964 pages, Hardcover

AVO

Satinder Chopra and John P. Castagna

AVO (SEG Investigations in Geophysics No. 16) by Satinder Chopra and John Castagna begins with a brief discussion on the basics of seismic-wave propagation as it relates to AVO, followed by a discussion of the rock-physics foundation for AVO analysis including the use of Gassmann’s equations and fluid substitution. Then, the early seismic observations and how they led to the birth of AVO analysis are presented. The various approximations for the Zoeppritz equations are examined, and the assumptions and limitations of each approximation are clearly identified. A section on the factors that affect seismic amplitudes and a discussion of the processing considerations important for AVO analysis are included. A subsequent section explores the various techniques used in AVO interpretation. Finally, topics including the influence of anisotropy in AVO analysis, the use of AVO inversion, estimation of uncertainties, and case studies are discussed. Equally helpful to entrants into the field as well as to seasoned workers, AVO will provide readers with the most up-to-date knowledge on amplitude variation with offset.

Catalog #119A Published 2014, 304 pages, Hardcover
Print ISBN 978-1-56080-319-5 SEG Members $119, List $216

AVO on USB

In addition to the printed, hardcover version, AVO also is available in PDF format on a USB drive. To aid the reader in accessing key developmental works referenced in the text, the USB contains over 130 seminal papers in PDF format.

Catalog #119C Published 2014, 304 pages, PDFs on USB

Purchase together and save!

Catalog #119S AVO and AVO on USB Set SEG Members $189, List $344

Methods and Applications in Reservoir Geophysics

Edited by David H. Johnston

Methods and Applications in Reservoir Geophysics (SEG Investigations in Geophysics No. 15) not only demonstrates the value of geophysics in reservoir management but also shows how to apply geophysical technologies more effectively in reservoir studies. The chapter editors have selected more than 40 papers from SEG and other journals and have added 13 new contributions. In the reservoir-engineering tutorial, geophysicists will discover a rich source of information on issues and data that are critically important to the engineer. In the geophysics tutorial, the engineer and the geophysicist will find explanations of the tools and data discussed in the book’s case studies. Each chapter then focuses on a different phase of field life: exploration appraisal, development planning, and production optimization. Geophysics is used in each of those stages to help address the critical technical issues and business decisions that the reservoir-management team faces. The case studies demonstrate the processes, methods, and techniques used in reservoir geophysics, not simply the results. The last chapter explores the road ahead and emerging technologies that define the future of reservoir geophysics. This book will be valuable for geophysicists, engineers, and all members of the reservoir-management team who want to ensure that the correct data are used to maximize reserves, optimize recovery, and contain costs.

Catalog #118A Published 2010, 668 pages, Hardcover

3D Seismic Imaging

Biondo L. Biondi

Seismic images are crucial to today’s exploration and reservoir monitoring. 3D Seismic Imaging (SEG Investigations in Geophysics Series No. 14) presents fundamental concepts and cutting-edge methods for imaging reflection seismic data. The book coherently presents the main components of seismic imaging—data-acquisition geometry, migration, and velocity estimation—by exposing the links that intertwine them. The book emphasizes graphical understanding over theoretical development. Several synthetic and field data examples illustrate the presentation of mathematical algorithms. Supplementary material contains a subset (C3-narrow-azimuth classic data set) of the SEG-EAGE salt data set and corresponding velocity model.

Catalog #117E Published 2006
https://doi.org/10.1190/1.9781560801689 SEG Members $84, List $153

Near-Surface Geophysics

Edited by Dwain K. Butler


Catalog #116A Published 2005, 756 pages, Hardcover
Print ISBN 978-1-56080-130-6 SEG Members $89, List $161
Interpretation of Three-Dimensional Seismic Data, seventh edition

Alistair R. Brown

Interpretation of Three-Dimensional Seismic Data (SEG Investigations in Geophysics Series No. 9 and AAPG Memoir 42) is the definitive and now classic text on the subject. Conceived in 1979 and first published in 1986, the book helps geoscientists extract more information from their seismic data and improve the quality of their interpretations. The primary focus of the book continues to be the synergy between 3D seismic data and the workstation. The author passionately addresses the widespread problem of underuse of data. Two new chapters and several new sections have been added in the seventh edition, but basic data understanding continues to be stressed.

Catalog #114A Published 2011
https://doi.org/10.1190/1.9781560802884 SEG Members $71, List $97

Magnetotellurics in the Context of the Theory of Ill-posed Problems

Mark N. Berdichevsky and Vladimir I. Dmitriev

This volume serves as an introduction to modern magnetotellurics originating with the pioneering work of Tikhonov and Cagniard. It presents a comprehensive summary of theoretical and methodological aspects of magnetotellurics. It provides a bridge between textbooks on electrical prospecting and numerous papers on magnetotelluric methods scattered among various geophysical journals and collections. The book has been written in the terms of the theory of ill-posed problems and contains a special chapter encouraging readers to master the elements of this theory that defines the philosophy of the physical experiment. The book thus offers the connected and consistent account of the principles of magnetotellurics from that single viewpoint. The book also brings together developments from many sources and involves some little-known results developed in Russia in Tikhonov's magnetotellurics school. Of particular interest are concluding chapters of the book that demonstrate the potential of magnetotellurics in oil and gas surveys, including discovery of the Urengoy gas field in Western Siberia, one of the largest gas fields in the world. This potential also is revealed in studies of the earth's crust and upper mantle.

Catalog #113A Published 2002, 230 pages, Hardcover

Seismic Data Analysis: Processing, Inversion, and Interpretation of Seismic Data (two volumes)

Öz Yılmaz

Öz Yılmaz’s best seller, Seismic Data Analysis: Processing, Inversion, and Interpretation of Seismic Data, has been republished as PDF files with a robust set of links, including links to cited sources. A single disc contains all of the contents of the 2,092-page, two-volume book set.

Catalog #112C Published 2008, one DVD
ISBN 978-1-56080-158-0 SEG Members $84, List $153

Offset-dependent Reflectivity — Theory and Practice of AVO Analysis

John P. Castagna and Milo M. Backus

Recognizing the need for education and further research in AVO, the editors have compiled an all-encompassing treatment of this versatile technology. In addition to providing a general introduction to the subject and a review of the current state of the art, this unique volume provides useful reference materials and data plus original contributions at the leading edge of AVO technologies.

Catalog #108E Published 1993
https://doi.org/10.1190/1.9781560802624 SEG Members $41, List $75

Multicomponent Seismology in Petroleum Exploration

R. H. Tatham and M. D. McCormack

This book focuses on applications of multicomponent seismology with emphasis on interpretation. Preliminary discussions on the basic fundamentals stress an understanding of what additional information is available in multicomponent seismic data; in particular, using P- and S-wave data allows estimations of lithology and fracture parameters. A discussion of laboratory observations develops some intuitive insight to assist in interpretation of multicomponent data, and acquisition and processing sections deal with those aspects that differ from conventional data acquisition and processing.

Catalog #106E Published 1991
https://doi.org/10.1190/1.9781560802556 SEG Members $25, List $45

Induced Polarization Applications and Case Histories


This book describes the induced polarization (IP) method, appropriately records the evolution of its development, and mentions those who were involved.

Catalog #806E Published 1990
https://doi.org/10.1190/1.9781560802594 SEG Members $26, List $47
Electromagnetic Methods in Applied Geophysics: Volume 1, Theory
Edited by Misac N. Nabighian
This first of two volumes presents mathematical and physical foundations common to all EM methods and has chapters on numerical and analog modeling. The chapters on electrical properties of rocks and resistivity characteristics of geologic targets help readers envisage different kinds of ground structures that may be addressed and the effect of various factors on observed conductivities of rocks. Basic principles of modern instrument design are discussed in the chapter on detection of repetitive EM signals. The last chapter discusses the principles of EM inversion as a first step toward achieving the elusive goal of automatic interpretation of EM data.
Catalog #138A-19 Published 2019, 264 pages, Hardcover

Electromagnetic Methods in Applied Geophysics: Volume 2, Applications
Edited by Misac N. Nabighian
This second of two volumes covers, in depth, the physical basis of EM methods of exploration magnetometric resistivity, profiling methods using small sources, large-layout harmonic field systems, EM soundings, time-domain EM prospecting methods, VLF, MT, CSAMT, airborne EM methods, borehole EM techniques, and electrical exploration methods for the seafloor. As the first volume focused on theory, this volume focuses on application.
Catalog #104A Published 1991, 992 pages, Paper
Print ISBN 978-1-56080-061-3 SEG Members $69, List $125

Geotechnical and Environmental Geophysics: Volume I: Review and Tutorial
Stanley H. Ward
The reviews and tutorials in Volume I, mostly invited papers, were not limited in size because they were prepared so that specialists and nonspecialists would both be served by the set of books. The articles are arranged in conventional textbook tradition: seismic, gravity and magnetics, electrical and electromagnetic, radio-
“Descriptions and Observations of Seeps,” includes field studies, observations of seep environments, migration systems, and use of modern sampling techniques. The second section, “Science of Seepage — Methodology,” discusses new techniques including DNA sampling, use of biomarkers, neural network analysis, and remote multispectral analysis. The final section, “Implications of Seeps,” shows how seeps may be used to reduce prospect risk and assess risk elements such as trap seal and fault leakage. This volume, copublished by SEG and AAPG, is intended to be a landmark reference for understanding seep occurrences and demonstrating the development and use of new technologies to image them with a focus on exploration and field development applications. It will be a valuable reference to geologists, geophysicists, and petroleum engineers everywhere.

Catalog #137A
Published 2013, 256 pages, Hardcover
SEG Members $65, List $99
SEG Members $55, List $84

Advances in Near-surface Seismology and Ground-penetrating Radar
Edited by Richard D. Miller, John H. Bradford, and Klaus Hellinger
Advances in Near-surface Seismology and Ground-penetrating Radar (SEG Geophysical Developments Series No. 15) is a collection of original papers by renowned and respected authors from around the world. Technologies used in the application of near-surface seismology and ground-penetrating radar have seen significant advances in the last several years. Both methods have benefited from new processing tools, increased computer speeds, and an expanded variety of applications. This book, divided into four sections—Reviews, Methodology, Integrative Approaches, and Case Studies—captures the most significant cutting-edge issues in active areas of research, unveiling truly pertinent studies that address fundamental applied problems. This collection of manuscripts grew from a core group of papers presented at a postconvention workshop, “Advances in Near-surface Seismology and Ground-penetrating Radar,” held during the 2009 SEG Annual Meeting in Houston, Texas. This is the first cooperative publication effort between the near-surface communities of SEG, AGU, and EEGS. It will appeal to a large and diverse audience that includes researchers and practitioners inside and outside the near-surface geophysics community.

Catalog #136A
Published 2010, 506 pages, Hardcover
SEG Members $65, List $82
SEG Members $55, List $70

Geophysical Characterization of Gas Hydrates
Edited by Michael Riedel, Eleanor C. Willoughby, and Satinder Chopra
The occurrence of gas hydrates in large quantities worldwide and their immense energy potential have prompted concerted efforts into their exploration and understanding. Geophysical characterization of natural gas-hydrate occurrences by seismic and other methods have gained prominence and such studies have been reported; however, no compilation of such studies has been attempted previously. This SEG publication, Geophysical Characterization of Gas Hydrates (Geophysical Developments No. 14), is the first book to focus on documenting various types of geophysical studies that are conducted for the detection and mapping of gas hydrates. Organized into five sections, the editors present 20 papers by experts in their respective fields plus introductory chapters for each section. Section 1 is an introduction and motivation for geophysical investigations into gas hydrates. Section 2 on seismic imaging discusses several seismic techniques with applications to various geologic settings. These comprise the indicators of gas hydrates in marine data such as BSRs, the use of AVO, seismic inversion, full-waveform inversion, VSPs, and multicomponent data in the assessment, detection, and quantification of gas hydrates. As the occurrence of gas-hydrate deposits affects the physical and chemical properties of the host sediments, various additional geophysical techniques, including electromagnetics, magnetics, and infrared imaging, are used for their detection, and these comprise Section 3. Section 4 discusses borehole methods aimed at characterization of gas-hydrate environments and includes the conventional log-based measurements, special logging measurements such as NMR, and logging-while-drilling and measurement-while-drilling applications. Finally, Section 5 discusses rock-physics modeling and gas-hydrate laboratory studies. Although rock-physics modeling helps link log measurements with seismic reflection profiles for estimating gas-hydrate concentrations, creation of artificial gas-hydrate-bearing sediments using different techniques also is necessary, for instance, when characterizing engineering properties of gas-hydrate-bearing sediments. The book will be of interest to geophysicists, petroleum geologists, geochemists, and those enthusiastic minds that seek the unknown in the field of energy resources.

Catalog #135A
Published 2010, 410 pages, Hardcover
Print ISBN 978-1-56080-218-1
SEG Members $89, List $161
SEG Members $76, List $137

Heavy Oils: Reservoir Characterization and Production Monitoring
Edited by Satinder Chopra, Laurence R. Lines, Douglas R. Schmitt, and Michael L. Batzle
Heavy Oils: Reservoir Characterization and Production Monitoring presents an integrated and general description of the development and production of heavy-oil fields throughout the world, with particular emphasis on geophysical characterization of heavy-oil fields. The book (SEG Geophysical Developments Series No. 13) introduces the economic impact of heavy oil as a major world energy resource. The origin of heavy-oil sands, its phase behavior, and unique physical properties are described in the context of the world’s major heavy-oil fields. Particular attention is paid to the unique rock physics of heavy-oil sands. This book describes a wide range of enhanced oil-recovery methods (EOR) including steam injection, solvent injection, cold production, and combustion. In all of these EOR methods, it is imperative to accurately describe the reservoir before and after production. As discussed in the book, this reservoir characterization requires integration of engineering, geology, and geophysics, with rock physics supplying a key link. Geophysical methods, especially time-lapse 3D seismic methods, are emphasized. The heavy-oil geology and production from major heavy-oil reservoirs is compared and contrasted. This book should prove interesting to all reservoir engineers, geologists, and geophysicists in this field.

Catalog #134A
Published 2010, 338 pages, Hardcover
Print ISBN 978-1-56080-222-8
SEG Members $79, List $143
SEG Members $67, List $122

Seismic True-amplitude Imaging
Jörg Schleicher, Martin Tygel, and Peter Hubral
A rich literature exists on computational methods based on wave equations for seismic imaging and earth-parameter estimation. Somewhat lost in the advance to progressively more sophisticated computational techniques are the intuitive ideas with roots that reach back to Hagedoorn and are based on ray theory, the geometry of data, and the geometry of wave propagation. In Seismic True-amplitude Imaging (SEG Geophysical Developments Series No. 12), the authors demonstrate that those simple ideas also lead to a broad description of the structure of the earth’s interior and the changes in medium parameters across reflectors. Demonstrations in the open literature of the efficacy of their methods abound. Now those ideas have been collected and reorganized. The book provides a pictorial presentation of the basic principles
Seismic Attributes for Prospect Identification and Reservoir Characterization
Satinder Chopra and Kurt J. Marfurt
Seismic attributes play a key role in exploration and exploitation of hydrocarbons. In "Seismic Attributes for Prospect Identification and Reservoir Characterization" (SEG Geophysical Developments No. 11), the authors introduce the physical basis, mathematical implementation, and geologic expression of modern volumetric attributes including coherence, dip/azimuth, curvature, amplitude gradients, seismic textures, and spectral decomposition. The authors demonstrate the importance of effective color display and sensitivity to seismic acquisition and processing. Examples from different basins illustrate the attribute expression of tectonic deformation, clastic depositional systems, carbonate depositional systems, and diagentic, drilling hazards, and reservoir characterization. The book is illustrated generously with color figures throughout. "Seismic Attributes" will appeal to seismic interpreters who want to extract more information from data; seismic processors and interpreters who want to learn how their efforts impact sub-test stratigraphic and fracture plays; sedimentologists, stratigraphers, and structural geologists who use large 3D seismic volumes to interpret their plays within a regional, basinwide context; and reservoir engineers whose work is based on detailed 3D reservoir models. Copublished with EAGE.

Hardrock Seismic Exploration
Edited by David W. Eaton, Bernd Milkerait, and Matthew H. Salisbury
Seismic methods have excellent depth penetration and resolving power for deep exploration in hardrock terranes. Through integrated case histories and introductory chapters on the basic principles of seismic acquisition, processing, modeling, and interpretation techniques, this book strikes a balance among tutorial, review, application, and future research directions, emphasizing the growing importance of seismic exploration methods in the hardrock environment ("old" techniques applied to "new" targets). Researchers interested in high-resolution applications of crustal seismology, geophysicists involved with mineral exploration and development, geotechnical engineers, and seismic processors will find this book an invaluable aid in the challenges of seismic exploration of hardrock terranes.

Planning Land 3-D Seismic Surveys
Andreas Cordsen, Mike Galbraith, and John Peirce
This book provides readers the tools to begin designing 3D seismic surveys. The substantial experiences of the authors in designing and acquiring land 3D seismic surveys make this a practical and useful book. Readers are expected to have a general working knowledge of 2D seismic data acquisition, processing, and interpretation. Some 3D experience is helpful but is not necessary to understand this material. Practical exercises are included to facilitate understanding of the subject matter. Some geophysicists may want to enhance their knowledge of 3D design by reading papers concerning their particular special interests. A reference list and a collection of other recommended reading are included. A searchable CD of the entire contents of the book also is included.

Covariance Analysis for Seismic Signal Processing
Edited by R. Lynn Kirlin and William J. Done
This volume is intended to provide the geophysical signal analyst with sufficient material to understand the usefulness of data covariance matrix analysis in the processing of geophysical signals. A background of basic linear algebra, statistics, and fundamental random signal analysis is assumed. This reference is unique in that the data vector covariance matrix is used throughout. Rather than addressing only one seismic data-processing problem and presenting several methods, the concentration in this book is on only one fundamental methodology — analysis of the sample covariance matrix — presenting many seismic data problems to which the methodology applies. This volume should interest many researchers, providing a method amenable to many distinct applications.

Three-Dimensional Electromagnetics
Edited by Michael Oristaglio and Brian Spies
This book covers major techniques used to compute, analyze, visualize, and understand 3D electromagnetic fields in every major application of electrical geophysics. The 44 papers, written specifically for this volume, are divided between techniques of 3D modeling and inversion (21 papers) and applications (23 papers). The latter include exploration for minerals and hydrocarbons, regional crustal studies, and environmental surveys. These contributions represent the work of 95 authors from 56 institutions in 13 countries.
Carbonate Seismology
Edited by Ibrahim Palaz and Kurt J. Marfurt
The first eight chapters establish the geologic framework and consist of review papers written by recognized experts in carbonate generation, rock properties, sequence stratigraphy, seismic stratigraphy, and structural deformation. The last 10 chapters illustrate the seismic expression of carbonate terranes through carefully chosen case studies drawn from the United States, Venezuela, Norway, China, Saudi Arabia, Italy, and the Bahamas, augmented by two studies of seismic signal-to-noise problems specific to carbonates. A recurring theme in each of these case studies is the importance of integrating seismic and petrophysical control with geologic models to better predict carbonate facies quality and distribution. This book is destined to become a well-worn reference volume for every geologist, geophysicist, and engineer involved in the exploration or exploitation of carbonate reservoirs.

Market:
Catalog #126A Published 1997, 452 pages, Hardcover
Print ISBN 978-1-56080-038-5 SEG Members $65, List $118

Applications of 3-D Seismic Data to Exploration and Production
Edited by Paul Weiner and Thomas L. Davis
Thirty profusely illustrated case studies from around the world demonstrate practical applications of 3D seismic data. This book covers fluvial-deltaic, eolian, deepwater clastic, carbonate, and structural reservoirs. Special emphasis is placed on the application of 3D seismic data to development drilling, reservoir characterization, and reservoir management. Extensive use of color illustrations and a 17×11-in format enhance the presentation. Copublished with AAPG.

Catalog #125A Published 1996, 270 pages, Paper
Print ISBN 978-0-89181-050-6 SEG Members $75, List $95

Amplitude Variation with Offset:
Gulf Coast Case Studies
James L. Allen and Carolyn P. Peddy
This book targets explorationists who want practical knowledge about a rapidly developing method for direct hydrocarbon detection. The authors’ goal is to allow interpreters of AVO data to “avoid the avoidable and beware of the pitfalls” that are incumbent with this method. Successes and failures of AVO analysis of data sets from the Yegua and Frio formations of onshore Texas were studied. Successful AVO examples reveal the potential of this technique in finding new opportunities in a mature area. Examination of dry holes drilled on AVO anomalies illustrates the problems associated with the method.

Catalog #124E Published 1993
https://doi.org/10.1190/1.9781560802495 SEG Members $25, List $45

Expert Systems in Exploration
Fred Aminzadeh and Marwan Simaan
This book examines a diverse set of petroleum exploration problems that properly designed expert systems can help solve. Chapter I provides an extensive review of expert systems as pertains to oil industry problems. Emphasis is given to how uncertainty and inexactness of data and rules from different disciplines could be handled by expert systems. The chapter suggests that fuzzy logic, evidential reasoning, and neural networks will prove essential in the design of many expert systems that are capable of solving more practical exploration problems. The problem of automatic picking of stacking velocities, using a rule based system, is addressed in Chapter 2. The expert system automates the task of picking the extreme of the velocity spectrum. The system incorporates common sense rules to distinguish primary reflection related peaks in the spectrum from those related to multiples and noise.

Catalog #123E Published 1991
https://doi.org/10.1190/1.9781560802532 SEG Members $20, List $36

Seismic Modeling of Geologic Structures:
Applications to Exploration Problems
Stuart W. Fagin
Seismic modeling offers a way of defining structure despite imaging shortcomings. The approach is presented in two sections. Part I is a review of modeling theory and practice. Various modeling techniques are described and contrasted, in light of the issues faced by the modeler. Part II is a series of case histories, presented by explorationists, in which they demonstrate how modeling was employed to solve an exploration problem.

Catalog #122E Published 1991
https://doi.org/10.1190/1.9781560802754 SEG Members $20, List $36

Shear-wave Exploration
S. H. Danbom and S. N. Domenico
This volume contains pertinent papers presented at a Shear-wave Exploration Symposium in early 1984 and at that year’s SEG Annual Meeting. Sixteen papers appear in the monograph, including two prepared especially for this volume: an introductory article by the coeditors and a comprehensive bibliography of papers concerning shear-wave exploration seismology compiled by R. A. Ensley. The volume is divided into five sections: overview and fundamental problems; unique acquisition and processing problems; field equipment and acquisition procedures; exploration applications, and theoretical studies—bases for future exploration techniques.

Catalog #812E Published 1987
https://doi.org/10.1190/1.9781560802761 SEG Members $20, List $36

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https://library.seg.org/home/book
The Seismic Signal and Its Meaning
André Luiz Romanelli Rosa

This purpose of this book, originally published in Portuguese in 2010 by SBGF (Sociedade Brasileira de Geofísica), is to fill the gap between theoretical literature and the routine activities of exploration and reservoir geophysicists. Focusing on concepts essential for geophysicists performing acquisition, processing, and/or interpretation, rules necessary for robust reservoir characterization are presented. With an extensive development of Gassmann's (and Biot) theory and its relevance, the book concentrates on phase and amplitude distortions to the seismic signal, the physical processes that it undergoes, and the interpretation methods to recover rock-physics properties. Capturing 30 years of teaching and improvement as a part of Petrobras internal courses, it serves as both a text and a reference for understanding the links between seismic data analysis theory and practice.

Catalog #183A-18 Published 2018, 788 pages, Hardcover

Microseismic Monitoring
Vladimir Grechka and Werner M. Heigl

Over the past decade, microseismic monitoring, a technology developed for evaluating completions of wells drilled to produce hydrocarbons from unconventional reservoirs, has grown increasingly popular among oil and gas companies. Microseismic Monitoring, by Vladimir Grechka and Werner M. Heigl, discusses how to process microseismic data, what can and cannot be inferred from such data, and to what level of certainty this might be possible. The narrative of the book follows the passage of seismic waves: from a source triggered by hydraulic fracture stimulation, through hydrocarbon-bearing formations, toward motion sensors. The waves' characteristics encode the location of their source and its focal mechanism. The analysis of various approaches to harvesting the source-related information from microseismic records has singled out the accuracy of the velocity model, fully accounting for the strong elastic anisotropy of hydraulically fractured shales, as the most critical ingredient for obtaining precise source locations and interpretable moment tensors. The ray theory complemented by its modern extensions, paraxial and Fréchet ray tracing, provides the only practical means available today for building such models. The book is written for geophysicists interested in learning and applying advanced microseismic data-processing techniques.

Catalog #182A-17 Published 2017, 468 pages, Hardcover
Print ISBN 978-1-56080-347-8 SEG Members $82, List $149

Handbook of Poststack Seismic Attributes
Arthur E. Barnes

The Handbook of Poststack Seismic Attributes is a general reference for poststack seismic attributes. It discusses their theory, meaning, computation, and application, with the goal of improving understanding so that seismic attributes can be applied more effectively. The chapters of the book build upon each other and progress from basic attributes to more involved methods. The book introduces the ideas that underlie seismic attributes and reviews their history from their origins to current developments. It examines attribute maps and interval statistics; complex trace attributes; 3D attributes that quantify aspects of geologic structure and stratigraphy, primarily dip, azimuth, curvature, reflection spacing, and parallelism; seismic discontinuity attributes derived through variances or differences; spectral decomposition, thin-bed analysis, and waveform classification; the two poststack methods that purportedly record rock properties — relative acoustic impedance through recursive inversion and Q estimation through spectral ratioing; and multattribute analysis through volume blending, cross-plotting, principal component analysis, and unsupervised classification. The book ends with an overview of how seismic attributes aid data interpretation and discusses bright spots, frequency shadows, faults, channels, diapirs, and data reconnaissance. A glossary provides definitions of seismic attributes and methods, and appendices provide background mathematics. The book is intended for reflection seismologists engaged in petroleum exploration, including seismic data interpreters, data processors, researchers, and students.

Catalog #181A-16 Published 2016, 268 pages, Hardcover
Print ISBN 978-1-56080-331-7 SEG Members $119, List $216

Encyclopedia of Exploration Geophysics
Edited by Vladimir Grechka and Kees Wapenaar

The Encyclopedia of Exploration Geophysics, edited by Vladimir Grechka and Kees Wapenaar, includes contributions of textbook- and tutorial-style articles on topics of interest to geophysicists. Articles are written either at an introductory level, accessible to students and practicing geophysicists who wish to learn an unfamiliar exploration subject, or at a more advanced level intended for readers who already have some working knowledge and would like to deepen and extend it. The papers are published online in SEG's Library after each is approved, edited, and composed. A print version of the Encyclopedia will be produced after most of the content appears online (Geophysical References Series No. 20). Posted papers include "Seismic characterization of fractured reservoirs," "Wide-azimuth amplitude-variation-with-off set analysis of anisotropic fractured reservoirs," "Estimating sub-surface parameter fields for seismic migration: Velocity model building," "Seismic imaging," "Seismic interferometry," "An introduction to full waveform inversion," and "Seismic, rock physics, spatial models, and their integration in reservoir geophysics.”

Catalog #180E https://doi.org/10.1190/1.9781560803027

Seismic Signatures and Analysis of Reflection Data in Anisotropic Media, third edition
Ilya Tsvankin

This is the third edition of Ilya Tsvankin's reference volume on seismic anisotropy and application of anisotropic models in reflection seismology. Seismic Signatures and Analysis of Reflection Data in Anisotropic Media, Geophysical References Series No. 19, provides essential background information about anisotropic wave propagation, introduces efficient notation for transversely isotropic (TI) and orthorhombic media, and identifies the key anisotropy parameters for imaging and amplitude analysis. To gain insight into the influence of anisotropy on a wide range of seismic signatures, exact solutions are simplified in the weak-anisotropy approximation. Particular attention is given to moveout analysis and P-waves where dominant source for inverse isotropy with a vertical (VTI) and tilted (TTI) symmetry axis. Description of the amplitude-variation-with-offset (AVO) response of P- and S-waves in TI media shows that anisotropy may cause serious distortions in both the measurement coefficient and geometrical-spreading factor. The far-reaching benefits of anisotropic processing methods are demonstrated on synthetic examples and field data.

Catalog #179A Published 2012, 458 pages, Hardcover
Print ISBN 978-1-56080-299-0 SEG Members $79, List $143
Multicomponent Seismic Technology
Bob A. Hardage, Michael V. DeAngelo,
Paul E. Murray, and Diana Sava

Much has changed since SEG published a comprehensive book on multicomponent seismic technology in 1991. The current volume, Multicomponent Seismic Technology (SEG Geophysical References Series No. 18) updates the subject. Emphasis is placed on practical applications of multicomponent seismic technology, with chapters dedicated to data-acquisition procedures, data-processing strategies, techniques for depth-registering P and S data, rock-physics principles, joint interpretations of P and S data, and numerous case histories that demonstrate the value of multicomponent data for evaluating onshore and offshore prospects. All forms of multicomponent seismic data are considered — three component, four component, and nine component. Interpretation focuses on elastic wavefield seismic stratigraphy, in which a seismic interpreter gives the same weight to S-wave data as to P-wave data when defining seismic sequences and seismic facies. S-wave splitting in fractured media and other key theoretical concepts are supported by numerous data examples. The book will be of interest to researchers in multicomponent seismic technology and to explorationists who have to locate and exploit energy resources. The book will be appreciated by those who shun mathematical theory because it explains principles and concepts with real data rather than with mathematical equations.

Catalog #178A  Published 2011, 336 pages, Hardcover

Seismology of Azimuthally Anisotropic Media and Seismic Fracture Characterization
Ilya Tsvankin and Vladimir Grechka

Because most sedimentary rocks encountered in oil and gas exploration are effectively anisotropic, it is imperative to properly estimate seismic anisotropy and incorporate it into data-processing and imaging algorithms. Seismology of Azimuthally Anisotropic Media and Seismic Fracture Characterization (SEG Geophysical References Series No. 17) presents a systematic analysis of seismic signatures for azimuthally anisotropic media and describes anisotropic inversion/processing methods for wide–azimuth reflection data and VSP (vertical seismic profiling) surveys. The main focus is on kinematic parameter-estimation techniques operating with wide-azimuth reflection data and VSP surveys. 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. The methods described are important in optical imaging, video imaging, medical and biological imaging, acoustical analysis, radar, and sonar.

Catalog #177A  Published 2011, 510 pages, Hardcover
Print ISBN 978-1-56080-228-0  SEG Members $79, List $143

Problems in Exploration Seismology and their Solutions
Lloyd P. Geldart and Robert E. Sheriff

This book is designed for students and for geophysicists who need a refresher on the basic theory required to solve practical problems. Geophysical texts often provide problems, but this book is unique in that it provides solutions also. The authors include a summary of the basic theory required to solve each problem. The 212 problems cover a wide range, including least-squares methods, choosing velocities for various situations, z-transforms, determining 2D and 3D field geometries, and solving processing and interpretation problems.

Catalog #174A  Published 2004, 524 pages, Hardcover
Print ISBN 978-1-56080-115-3  SEG Members $49, List $89
Encyclopedic Dictionary of Applied Geophysics, fourth edition

Robert E. Sheriff

The fourth edition of SEG’s best seller is a valuable, comprehensive reference that is a must for every geophysicist, geologist, explorationist, engineer, energy adviser, economist, editor, and student involved in the field. Hundreds of terms have been added since publication of the third edition in 1991, reflecting rapid evolution of the science, especially in the areas of engineering and production problems, 3D (including multicomponent) acquisition and processing, visualization, S- and converted waves, interpretation, anisotropy, AVO, geostatistics, geohazards, neural networks, tomography, downhole measurements, horizontal drilling, and deepwater work. Definitions of hundreds of other terms have been updated. The dictionary’s title has been modified slightly to reflect growth in application of geophysical methods, with the word Applied replacing the word Exploration. The dictionary includes a guide to pronunciation and a list of reference figures and tables. A CD containing the dictionary in searchable PDF format also is included.

Catalog #173APublished 2002, 442 pages plus CD, Hardcover
Print ISBN 978-1-56080-118-4 SEG Members $49, List $89

Uygulamali Jeogfizigin Ansiklopedik Sözlüğü

Robert E. Sheriff and Altan Necıoğlu

This is a Turkish translation of the fourth edition of SEG’s best-seller Encyclopedic Dictionary of Applied Geophysics. It is a valuable, comprehensive reference that is a must for every geophysicist, geologist, explorationist, engineer, energy adviser, economist, and student involved in the field.

Catalog #173TPublished 2006
https://doi.org/10.1190/1.9781560801979 SEG Members $33, List $60


3-D Seismic Survey Design, second edition

Gij J. O. Vermeer

Since the first edition of 3-D Seismic Survey Design appeared in 2002, seismic data acquisition has seen many changes, most of which have been captured in this second edition. This book by Gij Vermeer describes in detail the properties of 3D acquisition geometries and shows how these properties naturally lead to the 3D symmetric sampling approach to 3D survey design. Many examples from the literature are used to illustrate good and less good choices of acquisition parameters. The link between survey parameters and noise suppression as well as imaging is an intrinsic part of the contents. This book should be of great interest to the designer of 3D seismic surveys, but also to every geophysicist who uses 3D seismic data to retrieve accurate information on the properties of the subsurface.

Catalog #172A-2Published 2012, 368 pages, Hardcover
Print ISBN 978-1-56080-303-4 SEG Members $119, List $216

3-D Seismic Survey Design

Gij J. O. Vermeer

An essential ingredient for successful 3D seismic survey design is a basic understanding of the spatial properties of the seismic wavefield. These properties were described for 2D seismic data in Seismic Wavefield Sampling by the same author. This book extends the description into the much more complex field of 3D seismic data. A chapter on guidelines for survey design translates theory into practice. Some case histories illustrate the concepts. Noise suppression, resolution, and imaging are discussed in detail. Converted-wave survey design is covered in a separate chapter. This book provides essential knowledge for any acquisition or processing geophysicist and is recommended to everyone dealing with 3D seismic data. Supplementary material contains an Acquisition Design Wizard and survey optimization software.

Catalog #172EPublished 2002
https://doi.org/10.1190/1.9781560801757 SEG Members $50, List $91

Surface Exploration Case Histories: Applications of Geochemistry, Magnetics, and Remote Sensing

Edited by Dietmar Schumacher and Leonard A. LeSchack

Surface Exploration Case Histories, originally published in book form in 2002, provides an overview of successful applications of surface exploration methods. Through a series of independent case histories, this volume presents clearly documented evidence that demonstrates how geochemical, magnetic, and remote-sensing surface exploration methods can significantly reduce exploration risk and finding costs. The 19 chapters in this volume reflect the broad scope of applications for these methods: frontier basin reconnaissance, prospect development, prospect evaluation, and field development and production. The case histories span the globe: North America, Africa, South America, Europe, Middle East, and Australia. Surface Exploration Case Histories will interest explorationists and managers who seek to obtain the most out of each exploration dollar. Copublished with AAPG.

Catalog #171CPublished 2008, 486 pages, DVD
ISBN 978-1-58861-339-4 SEG Members $34, List $34

Geologic Applications of Gravity and Magnetics: Case Histories

Edited by Richard I. Gibson and Patrick S. Millegan

Exploration case histories ranging from classical salt interpretations to state-of-the-art gravity and magnetic gradiometry investigations are brought together in this CD, which was first published as a profusely illustrated 17×11-inch volume in 1998. Intended as a reference for exploration geoscientists, this collection of 24 papers includes regional tectonic and basin-analysis approaches to gravity and magnetic data as well as play, prospect, and field studies. The geographic scope is worldwide—the Gulf Coast, United Kingdom, West Siberia, offshore East Asia, and more. The technical papers are supplemented by commentary from diverse representatives of the gravity and magnetics community on how to attack exploration problems. Short features cover fundamental aspects of the geologic meaning of gravity and magnetic expressions. Some of these provide historical perspective on the use of the tools. A specialized glossary and annotated bibliography are provided to give the nonspecialist the resources to apply these data at all levels in a modern exploration environment. Copublished with AAPG.

Catalog #168CPublished 2009, 170 pages, CD
Geophysics in the Affairs of Mankind: A Personalized History of Exploration Geophysics
L. C. (Lee) Lawrey, Charles C. Bates, and Robert B. Rice
This personalized narrative is both a technical and economic history showing how exploration geophysics evolved from simple scientific beginnings into a sophisticated science impacting civilization in diverse ways. It presents geophysics as an intriguing scientific and technical field full of sharp contrasts, revealing it as an unusual blend of the theoretical and the practical, the laboratory and the field, the nonprofit effort and the profit-making venture, a cornerstone of peace and an implement of war. Written by members of the profession well acquainted with many of the key actions and players, this book describes intriguing developments and applications that took place within three interrelated fields of earth physics — exploration geophysics, seismology, and oceanography — during the never-ending search for oil and natural gas. Stressing challenge and change, this chronicle is bracketed by two major flex points in Western civilization — the initial waging of deadly global war (1914–1918) and the conclusion in the 1990s of the Cold War that had threatened civilization with nuclear annihilation. It is a complex story of people and events that highlights the emergence of major industries on the international scene. The book is essential reading for all practicing earth scientists and those interested in economic history showing how exploration geophysics evolved from simple scientific beginnings into a sophisticated science impacting civilization in diverse ways.

Catalog #170E Published 2001
https://doi.org/10.1190/1.9781560801788 SEG Members $21, List $38

Static Corrections for Seismic Reflection Surveys
Mike Cox
This reference manual is designed to enable more geophysicists to appreciate static corrections, especially their limitations, their relationship with near-surface geology, and their impact on the quality of final interpreted sections. The book is addressed to those involved in data acquisition (datum static corrections), data processing (datum static and residual static corrections), and interpretation (the impact that unresolved static corrections, especially the long-wavelength or low-spatial-frequency component, have on interpretation of the final section). Simple explanations of the underlying principles are included in an attempt to remove some of the mystique of static corrections. The principles involved are illustrated with simple models, supplemented with many data examples. This book details differences in approaches that must be considered among 2D, 3D, and crooked-line recordings as well as between P-wave and S-wave surveys. Static corrections are shown to be a simplified yet practical approach to modeling the effects of the near surface where a more correct wavefield or raypath-modeled method might not be undertaken efficiently. Chapters cover near-surface topography and geology; computation of datum static corrections; uphole surveys; refraction surveys; static corrections limitations and effect on seismic data processes; residual static corrections; and interpretation aspects. An extensive index and a large list of references are included.

Catalog #169E Published 1999
https://doi.org/10.1190/1.9781560801818 SEG Members $33, List $60

Tensors of Geophysics for Mavericks and Mongrels
Frank Hadsell
Geophysicists come from diverse academic disciplines including physics, geology, mathematics, engineering, and computer science. Students need a source where they can acquire a common language of mathematics that is appropriate to geophysics. This volume relies on five basic principles: conservation of momentum, conservation of energy, Maxwell’s equations, conservation of mathematical form, and embedding of calculi. It is assumed that those who study this book have a respectable background in mathematics, physics, and computer science as applied to time-series analysis. This book is intended for students who wish to acquire depth in the field of geophysics.

Catalog #165E Published 1995
https://doi.org/10.1190/1.9781560802464 SEG Members $20, List $36

Designing Seismic Surveys in Two and Three Dimensions
Dale G. Stone
Written for both the nongeophysicist and the practicing geophysicist, this book collects many of the formulas, principles, concepts, and field approximations of seismic survey design. The basics of 2D and 3D design in this book offer an introduction to the non-geophysicist and provide a good review for the practicing geophysicist. Arrays, obstacles, and special problems are discussed, as are aspects introduced by 3D surveys. The author explores design attributes such as fold, costs, and field time.

Catalog #164E Published 1994
https://doi.org/10.1190/1.9781560802730 SEG Members $20, List $36
Seismic Wavefield Sampling

Gijn J. O. Vermeer

The author provides theories and practical recommendations needed for an optimum seismic data acquisition technique, especially spatial sampling. After an introduction, Chapter 2 describes basic results of signal processing in the spatial coordinate for the 2D stacked seismic line. Chapter 3 introduces the 3D continuous wavefield of the 2D single seismic line and ends with examples of events in the 3D prestack wavefields. Chapter 4 discusses the recorded wavefield, and Chapter 5 deals with processing the recorded wavefield using theories developed previously. Chapter 6 summarizes important points discussed earlier.

Catalog #163E
https://doi.org/10.1190/1.9781560802440
SEG Members $17, List $31
Published 1990

An Overview of Exploration Geophysics in China — 1988

Jingxiang Zhao, Xuexin Fu, and Stanley H. Ward

This is the first collection of technical papers providing a general picture of exploration geophysics in China. Many case histories are included, plus some theory and technical developments.

Catalog #162E
https://doi.org/10.1190/1.9781560802662
SEG Members $33, List $60
Published 1989

A Practical Introduction to Borehole Geophysics: An Overview of Wireline Well Logging Principles for Geophysicists

J. Labo

The introduction to borehole geophysics presented here emphasizes hardware, operational aspects, key geophysical measurements along with their pitfalls, and an overview of well log interpretation principles. This introduction gives an explanation of what is seen at the wellsite while the interpretation chapters aid in understanding how logs are used for formation evaluation, their most immediate purpose. This overview will help in understanding how each piece of a logging course fits together. By understanding well-logging principles, an explorationist will have a better knowledge of geophysical well logging than is provided by an interpretation course alone and will develop a better background from which to make log quality judgments.

Catalog #805E
https://doi.org/10.1190/1.9781560802587
SEG Members $26, List $47
Published 1987

Understanding Signals: Basic waveform analysis from a geophysical perspective

Michael Burianyk

Written for students as well as professionals who work with and support geophysicists, this book presents a simple and informal discussion of fundamental concepts which underlie the quantitative part of geophysical analysis and interpretation. These general concepts are applicable for an analytical approach to any phenomena that can be measured and recorded. With examples and figures created using Microsoft Excel®, this book is accessible and insightful. Topics covered include: the concept of signals based on the sine function; the summation of sine waves as a more complicated signal; the notion of Fourier series and the spectral representation of signals; digital sampling and discrete representation of signals; the discrete Fourier transform and inverse transform; the concept of filtering in the spectral domain; and the idea of filtering outside of the spectral domain, by convolution, and the relationship between the measurement and spectral domains. This book will be valuable for geologists, junior seismic interpreters, software developers, high school and university students, and geophysical professionals seeking a refresher of the basic concepts.

Catalog #163A-19
Print ISBN 978-1-56080-357-7
Published 2019, 94 pages, Paper
SEG Members $19, List $35

Basic Geophysics

Enders A. Robinson and Dean Clark

For a thorough comprehension of the field of geophysics, we need to understand its origins. Basic Geophysics by Enders A. Robinson and Dean Clark takes us on a journey that demonstrates how the achievements of our predecessors have paved the way for our modern science. From the ancient Greeks through the Enlightenment to the greats of the contemporary age, the reasoning behind basic principles is explored and clarified. With that foundation, several advanced topics are examined, including: the 3D wave equation; ray tracing and seismic modeling; reflection, refraction, and diffraction; and WKBJ migration. The successful integration of the historical narrative alongside practical analysis of relevant principles makes this book an excellent resource for both novices and professionals, and all readers will gain insight and appreciation for the seismic theory that underlies modern exploration seismology.

Catalog #162A-17
Print ISBN 978-1-56080-345-4
Published 2017, 376 pages, Paper
SEG Members $76, List $139

High-resolution Seismic Exploration

Qing-Zhong Li

Capitalizing on knowledge learned over decades and combining underlying theory with practical cases, this book presents a systematic analysis of the issues involved in high-resolution seismic exploration. Translated from the original Chinese edition and updated to reflect contemporary developments, the book is adept at clarifying the objectives and approaches toward better precision in seismic prospecting. It provides innovative views on fundamental concepts including: perspective resolution and perspective S/N; the empirical relationship between compressional velocity ($V_p$) and absorption coefficient ($Q$); constructing basin absorption models; understanding sand layer tracking; improving dynamic and static corrections of near-surface effects as well as deconvolution; achieving maximum effective bandwidth of seismic data; and regressive seismic impedance inversion. It is an excellent reference for those
involved in seismic prospecting research, data processing, and geologic interpretation, and it is recommended for geophysicists and engineers as well as professors and graduate students.

Catalog #161A-17  
Print ISBN 978-1-56080-314-0  

Interpretation in Seismic Prospecting for Oil  
Donald A. Herron

Interpretation in Seismic Prospecting for Oil (SEG Geophysical Monograph Series No. 15) is a collection of the first six years of “Interpreter Sam” columns from The Leading Edge. It “carries on” with the stories of the fictitious Interpreter Sam, the sometimes hero, sometimes victim, and most often innocent bystander in circumstances typical of a seismic interpreter’s career in the oil and gas industry. As in the first Interpreter Sam volume, SEG Geophysical Monograph Series No. 15, each chapter of the book begins with a caricature of Sam (and others) created by David Carman. In the epilogue, Sam presents three verses, based on the works of three well-known poets but adapted to the modern interpretation environment. This book extends the storytelling tradition of its predecessor, paraphrasing the noted paleontologist and historian of nature Stephen Jay Gould, it retells actual events as stories with the intent to interest and to instruct, and as such is appropriate for readers of all persuasions.

Catalog #160A  

Remote Sensing in Action: The Curious Case of Sherlock Holmes and Albert Einstein  
Enders A. Robinson and Dean Clark

Remote Sensing in Action: The Curious Case of Sherlock Holmes and Albert Einstein (SEG Geophysical Monograph Series No. 18), by Enders A. Robinson and Dean Clark, questions a basic assumption of the scientific method — that new theories or experimental results are communicated effectively by traditional methods (e.g., presentations at professional meetings or publication in a peer-reviewed journal) — and suggests that the scientific method needs to be applied to the scientific method itself to find out if other styles of communication might work better. In a highly entertaining format, the book uses the popular fictional characters created by Sir Arthur Conan Doyle to unroll and explain the historical underpinnings of remote sensing. The extended appendices guarantee that all of the science of remote sensing is included in this book of “scientific fiction.” The story covers more than 2000 years, beginning with Pythagoras in ancient Greece and ending with Einstein’s first article on relativity in 1905. Light-years beyond a traditional science textbook, this detective story set in 1905 will teach students of all ages about the exciting journey of scientific history.

Catalog #158A  
Print ISBN 978-1-56080-313-3  

Fundamentals of Gravity Exploration  
Thomas R. LaFehr and Misac N. Nabighian

Fundamentals of Gravity Exploration (Geophysical Monograph Series No. 17) covers a full range of gravity-exploration topics, including first principles, field instrumentation and operations, rock densities and density contrasts, data reduction, methods of interpretation, and geologic examples. The subject matter includes inversion and an appendix on the Fourier transform. This book will help students to efficiently gain knowledge and appreciation for the method, and it will provide experienced earth scientists with a valuable addition to their exploration libraries, both for reference and understanding of this important method.

Catalog #157A  
Print ISBN 978-1-56080-305-8  

First Steps in Seismic Interpretation  
Donald A. Herron

In his classic text, Seismic Prospecting for Oil, C. Hewitt Dix remarks that the correlation of one reflection record with another, that is, the interpretation of seismic data, is a procedure that “can hardly be described in words.” First Steps in Seismic Interpretation (Geophysical Monograph Series No. 16) is a book about fundamental concepts and practices of seismic interpretation that attempts to achieve such a description. Intended for beginning interpreters, this book approaches interpretation via synthesis of concepts and practical applications rather than through formal treatment of basic physics and geology. It is based on the author’s personal experience as a seismic interpreter and is organized along the lines of notes from interpretation classes that he designs and teaches.

Catalog #156A  
Print ISBN 978-1-56080-298-3  

The Misadventures of Interpreter Sam  
Donald A. Herron

The Misadventures of Interpreter Sam (SEG Geophysical Monograph Series No. 15) is a collection of the first six years of “Interpreter Sam” columns from The Leading Edge. It contains commentary on both the humorous and serious sides of an interpreter’s day from the point of view of the fictitious Interpreter Sam, our Everyman of interpretation. Sam introduces each chapter with a caricature of himself (an interpretation of his own “reflection,” if you will, created by artist David Carman), and in the epilogue he offers a special gift to his friends in data processing. This book can be read and enjoyed by anyone who has ever interpreted even a single seismic line, by eager students who aspire to be interpreters, and by non-geoscientists who presume that they know how interpreters think.

Catalog #155A  
Print ISBN 978-1-56080-156-6  

Edge and Tip Diffractions: Theory and Applications in Seismic Prospecting  
Kamill Klem-Musatov, Arkady Aizenberg, Jan Pajebel, and Hans B. Helle

In Edge and Tip Diffractions: Theory and Applications in Seismic Prospecting (SEG Geophysical Monograph Series No. 14), the theoretical framework of the edge and tip wave theory of diffractions is elaborated from fundamental wave mechanics. Seismic diffractions are inevitable parts of the recorded wavefield scattered from complex structural settings and thus carry back to the surface information that can be exploited to enhance the resolution of details in the underground. The edge and tip wave theory of diffractions provides a physically sound and mathematically consistent method of comput-
ing diffraction phenomena in realistic geologic models. In this book, theoretical derivations are followed by their numerical implementation and application to real exploration problems. The book was written initially as lecture notes for an internal course in diffraction modeling at Norsk Hydro Research Center, Bergen, Norway, and later was used for a graduate course at Novosibirsk State University in Russia. The material is drawn from several previous publications and from unpublished technical reports. Edge and Tip Diffractions will be of interest to geoscientists, engineers, and students at graduate and Ph.D. levels.

Catalog #154A
Print ISBN 978-1-56080-120-7
SEG Members $25, List $45
SEG Members $67, List $122

Fundamentals of Geophysical Interpretation
Lawrence R. Lines and Rachel T. Newrick
Fundamentals of Geophysical Interpretation, SEG Geophysical Monograph Series No. 13, is a practical handbook for the petroleum geophysicist. Fundamental concepts are explained using heuristic descriptions of seismic modeling, deconvolution, depth migration, and tomography. Pitfalls in processing and contouring are described briefly. Applications include petroleum exploration of carbonate reefs, salt intrusions, and overthrust faults. The book includes past, present, and possible future developments in time-lapse seismology, borehole geophysics, multicomponent seismology, and integrated reservoir characterization.

Catalog #153A
SEG Members $29, List $53
SEG Members $25, List $45

The Microtremor Survey Method
Hiroshi Okada; translated by Koya Suto
The earth is full of geophysical signals. Passive geophysical methods such as gravity, magnetic, and magnetotelluric surveys detect these signals. The microtremor survey method listens to the natural seismic signals from road traffic, machinery, ocean waves, and meteorological sources and analyzes for subsurface acoustic properties, in particular the shear-velocity profile for the earth at a scale of a few meters to a few kilometers. The required instrumentation is simple and can be applied where conventional seismic surveying is difficult, particularly in urban areas. This book describes the nature of the microtremor noise field, the use of appropriate surface arrays of geophones, and the two principal classes of array-processing techniques (high-resolution beamforming and the spatial autocorrelation method, or SPAC). Applications of the method exist in earthquake-hazard site zonation and in engineering seismic investigations. This is the first comprehensive textbook of the microtremor survey method written in English. The translation and publication from the original Japanese text have been a joint project of SEG, the SEG of Japan, and the Australian SEG.

Catalog #152A
Print ISBN 978-1-56080-120-7
SEG Members $25, List $45
SEG Members $21, List $39

Reflection Coefficients and Azimuthal AVO Analysis in Anisotropic Media
Andreas Rüger
Observing offset-dependent seismic reflectivity has proven to be a valuable exploration tool for the direct detection of hydrocarbons. This monograph provides a comprehensive review of reflection coefficients and their approximations in isotropic media, followed by an in-depth discussion of reflection amplitudes in anisotropic media. No prior knowledge of seismic anisotropy is assumed, and considerable effort is spent to introduce wave propagation and medium parameterizations useful for surface seismic applications in the presence of anisotropy. The first anisotropic model discussed is transverse isotropy with a vertical axis of symmetry (VTI media), typically used to describe shale sequences. Then the study of VTI reflection coefficients is extended to transverse isotropy with a horizontal axis of symmetry (HTI) — the symmetry system that describes a system of parallel vertical cracks. Analysis of the “Shuey-type” approximate HTI P-wave reflection coefficient makes it possible to devise fracture-detection algorithms based on the inversion of azimuthal differences of the P-wave AVO gradient. The monograph also presents analysis of shear- and converted-wave reflection coefficients for HTI and orthorhombic models, discusses practical aspects of applying the azimuthal AVO analysis, and mentions promising results.

Catalog #150A
Print ISBN 978-1-56080-107-8
SEG Members $23, List $42
SEG Members $20, List $35

The Boundary Element Method in Geophysics
Shi-zhe Xu
The boundary element method (BEM) divides only the boundaries of the region under investigation into elements, so it diminishes the dimensionality of the problem, e.g., the 3D problem becomes a 2D problem, and the 2D problem becomes a 1D problem. This simplifies inputting the model into a computer and greatly reduces the number of algebraic equations. The advantage of this is even more evident for some 3D and infinite regional problems that often are encountered in geophysics. Originally published in China, this well-organized book is likely the most comprehensive work on the subject of solving applied geophysical problems. Basic mathematical principles are introduced in Chapter 1, followed by a general yet thorough discussion of BEM in Chapter 2. Chapters 3 through 7 introduce the applications of BEM to solve problems of potential-field continuation and transformation, gravity and magnetic anomalies modeling, electric resistivity and induced polarization field modeling, magnetotelluric modeling, and various seismic modeling problems. Finally, in Chapter 8, a brief discussion is provided on how to incorporate BEM and the finite-element method (FEM) together. In each chapter, detailed practical examples are given, and comparisons to both analytic and other numerical solutions are presented. This is an excellent book for numerically oriented geophysicists and for use as a textbook in numerical-analysis classes.

Catalog #149A
Print ISBN 978-1-56080-105-4
SEG Members $25, List $45
SEG Members $21, List $39

Theory and Application of Spectral Induced Polarization
Yanzhong Luo and Guiqing Zhang
The authors review spectral induced polarization (SIP) theory and describe some of the method’s applications through a discussion of their research in the People’s Republic of China. In the first of four chapters, they discuss the electrochemical basis of SIP, offering proof of the validity of using the Cole-Cole model for describing complex resistivity spectra. In Chapter 2, which addresses the SIP forward problem, the authors describe the scale-modeling laws for SIP, various forward algorithms, the behavior and variation laws of SIP anomalies, and effective SIP parameters. Chapter 3 discusses SIP inversion methods, including several methods of calculating the intrinsic spectral parameters of a polarizable body. In Chapter 4, the authors describe their field tests applying the SIP method to prospecting for ore bodies and oil and gas reservoirs. The material...
is introduced in part through a reprinting of a 1959 paper by volume editor James R. Wait, “The Variable Frequency Method.”

Catalog #148E  Published 1998  
https://dx.doi.org/10.1190/1.9781560802433  SEG Members $25, List $45

**A Handbook for Seismic Data Acquisition in Exploration**  
*Brian J. Evans*  
This illustration-rich book explains a broad spectrum of seismic data acquisition operations from a fundamental and practical standpoint, ranging from land to marine 2D methods to 3D seismic methods. The book explains why we use the seismic method in exploration and is written for geologists, field crews, exploration managers, petroleum engineers, and geophysicists. The book is written by a senior lecturer at a university and is ideal for use as a text in educational settings. It opens with a brief history of the origins of the seismic method. It explains how to understand what we see on shot records. It examines the problem of noise and how to improve seismic signals using geophone and hydrophone arrays. Other discussions cover land and marine receiver equipment, available energy sources, fundamental stacking methods as an approach to understanding operations of seismic instrumentation, basic geodetic systems, and the use of GPS systems. Each chapter concludes with exercises designed to emphasize problems of recording field data, including setting up survey parameters.

Catalog #147A  Published 1997, 320 pages, Paper  

**Fundamentals of Seismic Tomography**  
*Tien-when Lo and Philip Inderwiesen*  
This tutorial serves as a practical guide on seismic tomography for an audience familiar with basic seismology concepts and calculus. The intent is to provide the reader with a fundamental understanding of both seismic-ray tomography and seismic-diffraction tomography. Case studies illustrate processing methodology, basic interpretation techniques, and pitfalls. This presentation assists the reader in gaining a greater understanding of and appreciation for seismic-tomography articles found in the literature.

Catalog #146A  Published 1994, 186 pages, Paper  

**Inversion of Magnetotelluric Data for a One-dimensional Conductivity**  
*Kenneth P. Whittall and Douglas W. Oldenburg*  
In this short monograph, 1D inversion methods are examined collectively using a uniform notation. One-dimensional inversion methods are still important because there are geologic regions where lateral variation is small and 1D interpretation is directly applicable; 1D inverse solutions provide good starting models for 2D inversion; and understanding the 1D inverse problem provides a foundation for solving inverse problems in higher dimensions. The 10 chapters are “Introduction,” “Existence,” “Uniqueness,” “Asymptotic Methods,” “Lin-

Catalog #141E  Published 1971  
https://doi.org/10.1190/1.9781560802433  SEG Members $25, List $45

**Analysis of Least-squares Velocity Inversion**  
*Fadil Santosa and William W. Symes*  
This book grew out of an attempt to understand the mechanisms through which band-limited reflection seismograms determine velocity distributions in elastic models of the earth’s crust. The authors were especially interested in the feasibility of recovering very slowly varying (out-of-passband) velocity components from band-limited (high-frequency) reflection data. That interest was spurred by reports of successful inversions for layered media.

Catalog #144E  Published 1989  
https://doi.org/10.1190/1.9781560802488  SEG Members $20, List $36

**Pitfalls in Seismic Interpretation**  
*Paul M. Tucker and H. J. Yorston; edited by J. C. Hollister*  
The authors’ wisdom regarding pitfalls in interpretation is born of experience, not all of which was pleasant. Their work will be appreciated by all explorationists who have found that the earth’s crust and its seismic events are not well ordered. This monograph’s unique style makes delightful reading.

Catalog #142A  Published 1973, 56 pages, Paper  

**Elementary Gravity and Magnetics for Geologists and Seismologists**  
*L. L. Nettleton*  
This work is a general view of gravity and magnetics, not intended for experts but for nonspecialists who may not have a thorough appreciation of these methods in the overall petroleum-exploration picture.

Catalog #143E  Published 1982  
https://doi.org/10.1190/1.9781560802342  SEG Members $14, List $25

**Pitfalls Revisited**  
*Paul M. Tucker*  
This booklet expands on the interpretation traps listed in SEG’s popular monograph *Pitfalls in Seismic Interpretation*. Nontechnical and mental pitfalls are outlined in the sections on velocity, geometry, recording and processing, and stratigraphic traps.

Catalog #143E  Published 1982  
https://doi.org/10.1190/1.9781560802342  SEG Members $20, List $36

Visit seg.org/newbooks to learn about new releases.
Seismic Diffraction
Edited by Kamill Klem-Musatov, Henning C. Hocher, Tijmen Jan Moser, and Michael A. Pelissier

The use of diffraction imaging to complement the seismic reflection method is rapidly gaining momentum in the oil and gas industry. As the industry moves toward exploiting smaller and more complex conventional reservoirs and extensive new unconventional resource plays, the application of the seismic diffraction method to image sub-wavelength features such as small-scale faults, fractures and stratigraphic pinchouts is expected to increase dramatically over the next few years. Seismic Diffraction covers seismic diffraction theory, modeling, observation, and imaging. Papers and discussion include an overview of seismic diffractions, including classic papers which introduced the potential of diffraction phenomena in seismic processing; papers on the forward modeling of seismic diffractions, with an emphasis on the theoretical principles; papers which describe techniques for diffraction mathematical modeling as well as laboratory experiments for the physical modeling of diffractions; key papers dealing with the observation of seismic diffractions, in near-surface, reservoir, and crustal studies; and key papers on diffraction imaging.

Catalog #206A Published 2016, 822 pages, Paper

Classical and Modern Diffraction Theory
Edited by Kamill Klem-Musatov, Henning C. Hocher, Tijmen Jan Moser, and Michael A. Pelissier

Providing geophysicists with an in-depth understanding of the theoretical and applied background for the seismic diffraction method, Classical and Modern Diffraction Theory covers the history and foundations of the classical theory and the key elements of the modern diffraction theory. Chapters include an overview and a historical review of classical theory, a summary of the experimental results illustrating this theory, and key principles of the modern theory of diffraction; the early cornerstones of classical diffraction theory, starting from its inception in the 17th century and an extensive introduction to reprinted works of Grimaldi, Huygens, and Young; details of the classical theory of diffractions as developed in the 19th century and reprinted works of Fresnel, Green, Helmholtz, Kirchhoff, and Rayleigh; and the cornerstones of the modern theory including Keller’s geometrical theory of diffraction, boundary-layer theory, and super-resolution. Appendices on the Cornu spiral and Babinet’s principle also are included.

Catalog #205A Published 2016, 340 pages, Paper

Numerical Modeling of Seismic Wave Propagation: Gridded Two-way Wave-equation Methods
Edited by Johan O. A. Robertson, Joakim O. Blanch, Kurt Nibe, and Jeroen Tromp

Modeling of seismic wave propagation is a core component in almost every aspect of exploration seismology, ranging from survey design methods to imaging and inversion algorithms. Since SEG published a reprint volume on numerical modeling in 1990, the following two decades showed a step change in the application and use of “full wave equation” modeling methods enabled by the tremendous increase in available computational power. Full waveform inversion, reverse time migration, and 3D elastic finite-difference synthetic data generation are examples of modeling applications that are currently having a fundamental impact on our business. In Numerical Modeling of Seismic Wave Propagation: Gridded Two-way Wave-equation Methods, readers will find many of the well-known and referenced papers from the exploration seismic community as well as some of the key papers that have impacted other fields of seismology. Because the modeling literature is vast, we have limited the scope of the reprint volume to papers over the last two decades on modeling methods based on the full wave equation. The reprint volume will be of particular interest to researchers and practitioners interested in modeling methods and their applications. The searchable CD includes the 114-page book of abstracts and the full papers.

Catalog #202A Published 2012, 114 pages plus CD, Paper
Print ISBN 978-1-56080-290-7 SEG Members $79, List $143

Getting Started #10 – 3-D Seismic Technology...A Compendium of Influential Papers
Compiled by B. S. Hart

“Getting Started In...” is the reprint compilation series designed by the AAPG Editorial Board that provides a quick-start overview to help the worker in a new geographic area or someone trying to understand a new technology. Featured are key articles published in the specialty, selected by an expert in each area, and confirmed by a review committee. These articles (AAPG/Datapages Getting Started No. 10/SEG Geophysics Reprint Series No. 27) represent some of the best thinking on a subject to help the worker “Get Started!” Co-published with AAPG.

Catalog #203A Published 2008, CD
Print ISBN 978-1-58861-284-7 SEG Members $34, List $34

Seismic Interferometry: History and Present Status
Edited by Kees Wapenaar, Deyan Draganov, and Johan O. A. Robertson

Seismic Interferometry: History and Present Status (SEG Geophysics Reprint Series No. 26) shows that developments in seismic interferometry — the methodology of generating new seismic responses by crosscorrelation — have taken an enormous flight since the beginning of this century. In 2006, the editors of this volume compiled a supplement to GEOPHYSICS dedicated to this new branch of science. The 22 papers of the well-received supplement (recognized by one award for best paper and two honorable mentions for best paper in Geophysics and more than 100 citations in the first 20 months) form the basis for this reprint volume. The editors have added 50 papers from SEG and other journals, including Science, Physical Review, and Geophysical Research Letters. The book contains an editor’s introduction with extensive references and chapters on seismic interferometry without equations, highlights of the history of seismic interferometry from 1968 until 2003, and a more detailed overview of the rapid developments since 2004. Seismic Interferometry is an invaluable source for researchers and students interested in the theory and applications of interferometry in geophysical exploration (seismic and EM), seismology, ultrasonics, and underwater acoustics.

Catalog #202A Published 2008, 640 pages, Paper
The traditional purely compartmentalized approach has been superseded by a multidisciplinary collaborative workflow to build iteratively a subsurface velocity model suitable for detailed and quantitative imaging. Works that have had the most practical industrial application are emphasized rather than assessing all approaches equally. Hence, the bias is away from R & D and toward industrial practice. Because of the distribution of papers in this reprint edition, split between migration algorithm and velocity-estimation techniques, this volume will appeal to processing specialists and interpretation geoscientists alike.
Seismic and Acoustic Velocities in Reservoir Rocks, Volume 3, Recent Developments

Edited by Zhijing (Zee) Wang and Amos Nur

Volume 3 contains 36 papers divided into eight chapters representing a great mix of theoretical and experimental results. Both theories and data collected in this volume can be applied readily to solving problems and making decisions in reservoir and seismic modeling, interpretation, and monitoring. This book also includes the editors’ introductions and extensive bibliographies to each chapter and four never-before-published introductory papers by Zhijing Wang. The introduction to Chapter 4, “Pore Fluid Properties,” includes data from Yuguang Liu’s Ph.D. thesis. The bibliography includes more than 1,000 references. This volume addresses some important rock-physics and seismic topics, including applications of the Biot, Gassmann, and local flow theories; seismic anisotropy, shale properties, effects of fractures, porosity, and saturation on seismic velocities; pore-fluid properties including gases, hydrocarbon oils, water and brine, gas-liquid mixtures and solutions, and drilling muds; shear velocity prediction and the applications of $V/V_s$ soft sediments and sediments with gas hydrates; static versus dynamic elastic properties; and applications to reservoir characterization and seismic monitoring of reservoir processes.

Catalog #195A Published 2000, 633 pages, Paper
Print ISBN 978-1-56080-351-5 SEG Members $57, List $105

DMO Processing

Edited by Dave Hale

This collection of reprints documents the evolution of DMO processing. It contains numerous papers that developed both theoretical and practical aspects of DMO, including papers previously not readily available. Examples range from formerly unpublished manuscript for Judson et al.’s 1976 presentation on DEVILISH to Deregowski’s often cited but seldom seen 1987 paper on an integral implementation of DMO. In cases in which abstracts for oral presentations are the most widely available description of often-cited works, the abstracts have been reprinted in this volume. This collection is a useful reference for anyone working in seismic data processing.

Catalog #190A Published 1995, 496 pages, Paper
Print ISBN 978-1-56080-034-7 SEG Members $21, List $38

Seismic Physical Modeling

Edited by Daniel A. Ebram and John A. McDonald

For more than half a century, interpreters, researchers, and teachers have used physical-model data to better understand and communicate the behavior of seismic waves. Seismic interpreters faced with ambiguities in data analysis have long struggled with the dilemma of either puzzling through the real seismic data or looking at computer-generated synthetic data. Physical-model data lie at an intermediate position between those two extremes. The articles included in this book cover the entire chronology of physical modeling, from the first efforts in Japan in the late 1920s to the space-age laser-ultrasonic experiments of the 1990s. Of the 44 papers collected in this volume, more than half are from sources other than Geophysics. The applications covered in this book include interpretation of complicated subsurface structures, research into elastic and anisotropic wave phenomena, and teaching of fundamental seismic principles.

Catalog #189A Published 1994, 519 pages, Paper

Physics and Mechanics of Rocks: A practical approach

Manika Prasad

Rock physics is an interdisciplinary branch of geophysics that explains geophysical remote sensing data, such as seismic wave velocities or electrical conductivity, in the context of mineralogy, fluid content, and environmental conditions. Organized into two sections—fundamentals and applications—this book begins by explaining the fundamental principles of rock physics, such as how to estimate the stiffness of the rock frame. Basic rock properties, such as stiffness and compliance, velocity and modulus, and electrical conductivity, are introduced, and insights are provided about the effects of varying lithology, mineralogy, texture, and fluids. The fundamentals section concludes with a discussion of petrophysical properties of porosity, permeability, saturation and fluid type, and fluid saturation. Then applications of rock physics are discussed, including how to create synthetic seismic data, perform fluid substitution, and explore and develop trends using well-log and seismic data. Throughout this section, the causes for complications and deviations from basic correlations are investigated, and the section includes the presentation of a composite seismic and well-log study underlain by rock physics principles.

E-mail books@seg.org to be notified when this title is available.

Seismic Attributes as the Framework for Data Integration throughout the Oilfield Life Cycle

Kurt J. Marfurt

Useful attributes capture and quantify key components of the seismic amplitude and texture for subsequent integration with well log, microseismic, and production data through either interactive visualization or machine learning. Although both approaches can accelerate and facilitate the interpretation process, they can by no means replace the interpreter. Interpreter “grayware” includes the incorporation and validation of depositional, diagenetic, and tectonic deformation models, the integration of rock physics systems, and the recognition of unanticipated opportunities and hazards. This book is written to accompany and complement the 2018 SEG Distinguished Instructor Short Course that provides a rapid overview of how 3D seismic attributes provide a framework for data integration over the life of the oil and gas field. Key concepts are illustrated by example, showing modern workflows based on interactive interpretation and display as well as those aided by machine learning.

Catalog #239A Published 2018, 508 pages, Paper

3C Seismic and VSP: Converted waves and vector wavefield applications

James Gaiser

3C seismic applications provide enhanced rock property characterization of the reservoir that can complement P-wave methods. Continued interest in converted P- to S-waves (PS-waves) and vertical seismic profiles (VSPs) has resulted in the steady development of advanced vector wavefield techniques. PS-wave images along with VSP data can be used to help P-wave interpretation of structure in gas-obscured zones, of elastic and fluid properties for lithology discrimination from S-wave impedance and density inversion in unconventional reservoirs, and of fracture characterization and stress monitoring from S-wave birefringence (splitting) analysis. The book, which accompanies the 2016 SEG Distinguished Instructor Short Course, presents an overview of 3C seismic theory and practi-
Microseismic Imaging of Hydraulic Fracturing: Improved Engineering of Unconventional Shale Reservoirs
Shawn Maxwell
Microseismic Imaging of Hydraulic Fracturing: Improved Engineering of Unconventional Shale Reservoirs (SEG Distinguished Instructor Series No. 17) covers the use of microseismic data to enhance engineering design of hydraulic fracturing and well completion. The book, which accompanies the 2014 SEG Distinguished Instructor Short Course, describes the design, acquisition, processing, and interpretation of an effective microseismic project. The text includes a tutorial of the basics of hydraulic fracturing, including the geologic and geomechanical factors that control fracturing growth. In addition to practical issues associated with collecting and interpreting microseismic data, potential pitfalls and quality-control steps are discussed. Actual case studies are used to demonstrate engineering benefits and improved production through the use of microseismic monitoring. Providing a practical user guide for survey design, quality control, interpretation, and application of microseismic hydraulic fracturing monitoring, this book will be of interest to geoscientists and engineers involved in development of unconventional reservoirs.

Catalog #237A
SEG Members $38, List $69

Practical Applications of Time-lapse Seismic Data
David H. Johnston
Time-lapse (4D) seismic technology is a key enabler for improved hydrocarbon recovery and more cost-effective field operations. Practical Applications of Time-lapse Seismic Data (SEG Distinguished Instructor Series No. 16) shows how 4D seismic data are used for reservoir surveillance, how they provide valuable insight on dynamic reservoir properties such as fluid saturation, pressure, and temperature, and how they add value to reservoir management. The material, based on the 2013 SEG Distinguished Instructor Short Course, includes discussions of reservoir-engineering concepts and rock physics critical to the understanding of 4D data, along with topics in 4D seismic acquisition and processing. A primary focus of the book is interpretation and data integration. Case-study examples are used to demonstrate key concepts and are drawn on to demonstrate the range of interpretation methods currently employed by industry and the diversity of geologic settings and production scenarios in which 4D is making a difference.

Catalog #236A
SEG Members $38, List $69

Seismic Acquisition from Yesterday to Tomorrow
Julien Meunier
During the last few years, seismic acquisition has gone through a phase of fast acceleration, attested to by the development of wide-azimuth surveys, the continuous increase in channel count, and the progress in simultaneous shooting. These developments, made possible by technological advancements today, will enable the production of clearer seismic images tomorrow. Seismic Acquisition from Yesterday to Tomorrow (SEG Distinguished Instructor Series No. 14), the companion book for the 2011 SEG/EAGE Distinguished Instructor Short Course, offers a reflection on this evolution. It begins with a short historical overview, followed by discussions of signal and noise. The core of the book is the relationship between acquisition parameters and seismic image quality. It will provide geoscientists and all those interested in seismic images with the still unconventional view of seismic data acquisition as the first component of seismic imaging. (DISC on DVD, 760A, also is available.)

Catalog #234A
SEG Members $33, List $60

Geophysics Under Stress: Geomechanical Applications of Seismic and Borehole Acoustic Waves
Colin Sayers
Geophysics Under Stress: Geomechanical Applications of Seismic and Borehole Acoustic Waves (SEG Distinguished Instructor Series No. 13) covers selected phenomena encountered in the acquisition, processing, and interpretation of reflection–seismic data. The material, based on the 2012 SEG Distinguished Instructor Short Course, shows how those phenomena arise, how they can be characterized, and the important information they contain. The text shows how spectral decomposition and time-frequency methods have led to improved understanding and use of nonlinear harmonics, near-surface guided waves, layer-induced anisotropy, velocity dispersion and attenuation, interference, and Biot reflection. Accessible discussion is augmented by examples, figures, and references to primary literature for further study. This book will interest technical managers and those who work in acquisition, processing, and interpretation of seismic data.

Catalog #235A
SEG Members $45, List $82

Elements of Seismic Dispersion: A Somewhat Practical Guide to Frequency-dependent Phenomena
Christopher L. Liner
Elements of Seismic Dispersion: A Somewhat Practical Guide to Frequency-dependent Phenomena (SEG Distinguished Instructor Series No. 15) covers selected elements of geophysics under stress. The book, which accompanies the 2010 SEG/EAGE Distinguished Instructor Short Course, provides the basis for applying geophysics and rock-physics solutions to geomechanical challenges in exploration, drilling, and production and is designed for a broad range of geoscientists and engineers.
who work in the petroleum industry. The book is suitable for individuals from subsurface disciplines as well as drilling, reservoir, and petroleum engineering. (DISC on DVD, 759A, also is available.)

Catalog #233A Published 2010
Print ISBN 978-1-56080-196-5 SEG Members $38, List $69

Petroleum Geoengineering: Integration of Static and Dynamic Models
Patrick Corbett
Petroleum Geoengineering: Integration of Static and Dynamic Models (SEG Distinguished Instructor Series No. 12) explores improved linkage among techniques used at various scales to describe and model petroleum reservoirs. The book, which accompanies the 2009 SEG/EAGE Distinguished Instructor Short Course, is designed for a broad range of geoscientists and engineers working in the petroleum industry. The ultimate objectives are to enable technical staff members to maximize the recovery of hydrocarbons. The impact of petrophysical heterogeneity at various scales on the recovery of oil and gas provides the focus for the book. The integrated nature of the book makes it suitable for people from all subsurface disciplines (geology, geophysics, petrophysics, geomodeling, and reservoir and petroleum engineering). Petroleum Geoengineering is also very appropriate for directing teams of subsurface staff members. (DISC on DVD, 758A, also is available.)

Catalog #232A Published 2009, 112 pages, Paper

Reservoir Geophysics: Applications
William L. Abriel
Reservoir Geophysics: Applications (SEG Distinguished Instructor Series No. 11) covers the application and impact of seismic data on oil and gas reservoirs. The material, based on the 2008 SEG/EAGE Instructor Short Course, shows how geoscientists use seismic data to determine critical reservoir characteristics in the stages of project life from delineation through secondary recovery. The text describes the main business drivers of the operator and how seismic data help in addressing subsurface uncertainties for business purposes. The book discusses delineation, development, production, and geophysics applications in heavy-oil and carbonate reservoirs. Also included are two hands-on student problems based on actual projects. Illustrations include examples that focus on business value. The book will be of interest to geoscientists, managers, and operators. (DISC on DVD, 757A, also is available.)

Catalog #231A Published 2008, 136 pages, Paper
Print ISBN 978-1-56080-146-7 SEG Members $45, List $82

Concepts and Applications in 3D Seismic Imaging
Biondo L. Biondi
Concepts and Applications in 3D Seismic Imaging (SEG Distinguished Instructor Series No. 10) provides a broad and intuitive understanding of seismic-imaging concepts and methods that enables geoscientists to make appropriate decisions during acquisition, processing, imaging, and interpretation. This book, first published for use with the SEG/EAGE 2007 Distinguished Instructor Short Course, also exposes participants to current trends in imaging research and empowers them to adopt new technologies quickly. Seismic images are the basis of critical exploration, development, and production decisions. Optimal use of these images requires full understanding of the processes that create them, from data acquisition to final migration. (DISC on DVD, 756A, also is available.)

Catalog #230A
Print ISBN 978-1-56080-139-9 SEG Members $45, List $82

Insights and Methods for 4D Reservoir Monitoring and Characterization
Rodney Calvert
Insights and Methods for 4D Reservoir Monitoring and Characterization (SEG Distinguished Instructor Series No. 8) covers the application and impact of 4D monitoring for the oil and gas industry, along with some requirements, modeling, and acquisition techniques for ensuring good data and using them to diagnose various reservoir production effects and to update reservoir simulation models. The treatment is designed to provide an understanding of basic underlying principles for specialists in all geoscience disciplines and their managers. The book, based on the SEG/EAGE 2005 Distinguished Instructor Short Course, also treats recently emerged techniques. Key lessons are that nearly all models and predictions without reservoir monitoring are likely to be wrong and that 4D monitoring can be much more than a repetition of conventional 3D surveys. Better methods are available to measure small production differences sensitively. (DISC on DVD, 754A, also is available.)

Catalog #228A
Print ISBN 978-1-56080-128-3 SEG Members $45, List $82

Petroleum Systems of Deepwater Settings
Paul Weimer and Roger M. Slatt
Petroleum Systems of Deepwater Settings (SEG Distinguished Instructor Series No. 12) explores improved linkage among techniques used at various scales to describe and model petroleum reservoirs. The book, which accompanies the 2009 SEG/EAGE Distinguished Instructor Short Course, includes sections on covariance and the variogram, interpolation, heterogeneity modeling, uncertainty quantification, and geostatistical inversion. (DISC on DVD, 752A, also is available.)

Catalog #227E
Published 2004
Print ISBN 978-1-56080-186-8 SEG Members $45, List $82

Geostatistics for Seismic Data Integration in Earth Models
Olivier Dubrule
This book will help geoscientists understand how geostatistics fits into their workflow, what tools and techniques they should use, and what added value may result. Geostatistics is now used not only in reservoir characterization but also in velocity analysis, time-to-depth conversion, seismic inversion, uncertainty quantification, and seismic data integration in earth models. The book, part of the SEG/EAGE 2003 Distinguished Instructor Short Course, includes sections on covariance and the variogram, interpolation, heterogeneity modeling, uncertainty quantification, and geostatistical inversion. (DISC on DVD, 752A, also is available.)

Catalog #226A
Published 2003

Order print books and removable media today at seg.org/shop. Purchase SEG eBooks at library.seg.org/home/book.
Understanding Seismic Anisotropy in Exploration and Exploitation, second edition
Leon Thomsen

Understanding Seismic Anisotropy in Exploration and Exploitation, second edition by Leon Thomsen is designed to show you how to recognize the effects of anisotropy in your data and to provide you with the intuitive concepts that you will need to analyze it. Since its original publication in 2002, seismic anisotropy has become a mainstream topic in exploration geophysics. With the emergence of the shale resource play, the issues of seismic anisotropy have become central, because all shales are seismically anisotropic, whether fractured or not. With the advent of wide-azimuth surveying, it has become apparent that most rocks are azimuthally anisotropic, with P-wave velocities and P-AVO gradients varying with source-receiver azimuth. What this means is that analysis of such data with narrow-azimuth algorithms and concepts will necessarily fail to exploit this expensively acquired data. The issues include not only seismic wave propagation, but also seismic rock physics. Isotropic concepts including velocity, Young’s modulus, and Poisson’s ratio have no place in the discussion of anisotropic rocks, unless qualified in some directional way (e.g., vertical Young’s modulus). Likewise, fluid substitution in anisotropic rocks, using the isotropic Biot/Gassmann formula, leads to formal errors, because the bulk modulus does not appear, in a natural way, within the anisotropic P-wave velocity. Updated in 2014, this edition addresses all contemporary concerns.

Catalog #225A Published 2014, 304 pages, Paper
Print ISBN 978-1-56080-326-3 SEG Members $45, List $82

Seismic Amplitude Interpretation
Fred J. Hilterman

During the last 30 years, seismic interpreters routinely have applied bright-spot and AVO technology for recognizing prospects and predicting lithology. New amplitude attributes were added to this technology as new exploration problems were defined. R & D continues in the field of amplitude interpretation, especially when E & P costs escalate as more severe environments are explored, such as ultradepthwater plays. With the high interest in reducing exploration risk, this course addresses the methodology of an amplitude interpretation and the subsequent benefits and limitations that one can expect in various rock-property settings. This book, originally produced for use with the 2001 SEG/EAGE Distinguished Instructor Short Course, begins with a review of the relationships between rock properties and geophysical observations. Practical problems illustrate the assumptions and limitations of commonly used empirical transforms, and procedures for conducting and verifying fluid-substitution techniques are presented. The book identifies components of the seismic response best suited for differentiating pore fluid from lithologic effects. Field examples emphasize what combination of seismic signatures should be expected for different rock-property environments. To help select the best seismic attribute for calibrating amplitude to rock properties, general rules are provided for predicting AVO responses and interpreting lithology from observed responses. A case history also is provided. The last part examines the numerous amplitude attributes that can be extracted from seismic data to quantify an interpretation. Benefits and limitations of these attributes in soft- to hard-rock environments are discussed with model data and in case histories. (DISC on DVD, 750A, also is available.)

Catalog #224A Published 2001, 244 pages, Paper

Shear Waves from Acquisition to Interpretation
Robert Garotta

This book, produced for use with the third SEG Distinguished Instructor Short Course, addresses the practical aspects of multicomponent data acquisition, processing, and interpretation. The first part of the book is devoted to overcoming the difficulties associated with shear-wave acquisition. Converted-mode operation is covered in detail using real-life examples. The particularities of sea-bottom receivers also are examined. The second part reviews the processing and the main challenges of the shear-converted modes: static corrections, gathering, velocity analysis, and compensation for shear-wave splitting in axial anisotropy. The book provides a detailed description of processing sequences, and 2D and 3D results, yielding natural axis orientation of layers, are compared in shear and PS converted modes. The third part is devoted to case histories in which new attributes, such as Vp/Vs ratio, crack density, or fracture orientation, are illustrated in a reservoir-characterization context. These case histories can guide the geophysicist to decide if a particular geologic situation can be handled best using shear waves.

Catalog #223E Published 1999
https://doi.org/10.1190/1.9781560802402 SEG Members $38, List $69

The Seismic Velocity Model as an Interpretation Asset
Phil Schultz

A velocity model can have enduring and growing interpretive value, beyond its initial creation to optimize the seismic image. The 3D velocity model often is built carefully with a combination of geophysical and geologic input because of the accuracy demands placed on it by the requirements of depth imaging. As such, this model becomes an increasingly effective interpretive tool. This book, first published for use with the second SEG Distinguished Instructor Short Course, addresses ways in which the interpreter should participate in the development of the velocity model and underscores the velocity model’s interpretive value with numerous case-study examples. This volume will be invaluable to interpreters who are excited about the prospect of participating actively in the velocity model-building process and who wish to pursue aggressively the additional advantages offered by using the velocity model during interpretation.

Catalog #222A Published 1998, 232 pages, Paper
Print ISBN 978-1-56080-091-0 SEG Members $45, List $82

Time-lapse Seismic in Reservoir Management
Ian G. Jack

This book, prepared for use with the first SEG Distinguished Instructor Short Course, discusses “time-lapse seismic” and enables geoscientists to assess the value and risk of this new technology. It covers the rationale and driving forces behind time-lapse seismic by examining the limitations of existing methods of tracking fluid flow between wells. It examines those reservoir properties that change with time and what can be observed on seismic data over elapsed time. The repeatability of seismic data and the use of “legacy” data sets are discussed, along with a review of the seismic data acquisition schemes and data processing requirements for time-lapse analysis. The rock-physics foundation for data analysis and interpretation options also are described. A selection of industry case histories illustrates many of these points. The reader will gain an understanding of key success factors, key calibration requirements, and key uncertainties of time-lapse seismic in reservoir management.

Catalog #221E Published 1997
https://doi.org/10.1190/1.9781560802748 SEG Members $38, List $69
Illustrated Seismic Processing
Volume 1: Imaging
Stephen J. Hill and Andreas Rüger
This book provides a foundation for understanding the vigorous and fascinating field of seismic processing. Written for the non-expert, this two-volume introductory text reveals the limitations and potential pitfalls of seismic data, prepares both seismic interpreters and acquisition specialists for working with seismic processing geophysicists, explains seismic processing operations as a series of solutions to problems, and demonstrates the dependence of a final interpretable seismic volume on its many seismic processing decisions. Although seismic processing is inherently mathematical, this text uses numerous illustrations and real data examples, providing an intuitive understanding of the seismic processing procedures, resorting to an algebra-based argument only on rare occasions. By starting with migration in the first volume and concluding with deconvolution in the second volume, this text presents seismic processing topics in a reversed order compared to a customary processing sequence. The reader will examine input requirements for algorithms and then be equipped to understand the processing flow algorithms themselves.

Volume 2: Preimaging
Coming Soon!!

A Practical Understanding of Pre- and Poststack Migrations, volume 1 (Poststack), 2007 edition
John C. Bancroft
This volume, SEG Course Notes Series No. 13, is designed to give the practicing geophysicist an understanding of the principles of poststack migration, presented with intuitive reasoning rather than laborious math. Modeling is introduced as a natural process that starts with a geologic model and then builds seismic data. Migration is then described as the reverse process that uses seismic data to find the geologic model. Many other topics are covered relating to the quality of the migrated section, such as aliasing, rugged topography, or use of the correct velocity. Significant new material has been added in this revised edition of the original 1997 book, especially algorithms based on the phase-shift method, such as PSPI and the omegaX method.

A Practical Understanding of Pre- and Poststack Migrations, volume 2 (Prestack), 2007 edition
John C. Bancroft
This volume, SEG Course Notes Series No. 14, is designed to give the practicing geophysicist an understanding of the principles of prestack migration, presented with intuitive reasoning that avoids difficult math. Modeling with common-shot record and a constant-offset geometry of the upper 100 meters of the subsurface. This primer focuses on processing two small data sets using standard common-midpoint (CMP) processing and includes significant processing pitfalls encountered in previous work. The primer includes a booklet and accompanying data sets on CD.

Model-Based Depth Imaging
Stuart W. Fagin
This is an informal review of the principal techniques and issues associated with prestack depth imaging. The intended audience for this book would be seismic interpreters, processors, managers, and explorationists who require basic familiarity with the technology that has so greatly expanded the range of geologic structures that can be imaged successfully. The emphasis of the book is on velocity-model building techniques that are the key to successful depth imaging.

Seismic Modeling and Imaging with the Complete Wave Equation
Ralph Phillip Boding and Larry R. Lines
Seismic modeling and imaging of the earth’s subsurface are complex and difficult computational tasks. The authors present general numerical methods based on the complete wave equation for solving these important seismic exploration problems.
Geophysical Data Analysis: Understanding Inverse Problem Theory and Practice
Max A. Meju
This publication is designed to provide a practical understanding of least-squares methods of parameter estimation and uncertainty analysis. The practical problems covered range from simple processing of time- and space-series data to inversion of potential field, seismic, electrical, and electromagnetic data. The various formulations are reconciled with field data in the numerous examples provided in the book; well-documented computer programs also are given to show how easy it is to implement inversion algorithms.
Catalog #256E Published 1994
https://doi.org/10.1190/1.9781560802570 SEG Members $20, List $36

Seismic Stratigraphy and Hydrocarbon Traps: Louisiana Onshore and Offshore
Allen Lowrie
Synergisms among tectonics, sedimentation, and climate/sealevel oscillations provide hydrocarbon source, reservoirs, and traps. This book from the SEG Course Notes series examines these traits, as they exist in the on- and offshore region of Louisiana.
Catalog #255E Published 1994
https://doi.org/10.1190/1.9781560802549 SEG Members $20, List $36

Dip Moveout Processing
Dave Hale
This volume assists geophysicists in implementing and evaluating dip moveout (DMO) processing. With chapters on why to choose DMO, DMO fundamentals, DMO by Fourier transform, DMO by integral methods, and DMO for depth-variable velocity, this book discusses the theory, motives, and limitations underlying the most popular DMO methods.
Catalog #254A Published 1991, 106 pages, Paper

Introduction to Seismic Inversion Methods
Brian H. Russell
Inversion is defined as mapping the physical structure and properties of the subsurface of the earth using measurements made on the surface, creating a model of the earth using seismic data as input. In Introduction to Seismic Inversion Methods, an overview of techniques used in the inversion of seismic data is provided.
Catalog #252A Published 1988, 176 pages, Paper

Digital Processing of Geophysical Data — A Review
Roy O. Lindseth
Originating in 1967 as notes to accompany a basic seminar for the Canadian SEG and then expanded in 1968 as an SEG Continuing Education course, Digital Processing of Geophysical Data — A Review focuses on how to choose processes and parameters for any given field data.
Catalog #251A Published 1982, 294 pages, Paper
Print ISBN 978-0-931830-50-1 SEG Members $49, List $89
Anisotropy 2000: Fractures, Converted Waves, and Case Studies
Luo T. Ikelle and Anthony Gangi
This volume contains 25 papers that represent most of the best work in seismic anisotropy in 1998 and 1999. Fracture characterization and processing of converted waves are the two main topics covered in this volume. They are addressed from both theoretical and practical viewpoints. Also included are papers describing the historical roots of seismic anisotropy.
Catalog #334E Published 2001
https://doi.org/10.1190/1.9781560801771 SEG Members $26, List $47

Advances in Anisotropy: Selected Theory, Modeling, and Case Studies
Julie A. Hood
This volume is a collection of papers from the Seventh International Workshop on Seismic Anisotropy (7IWSA). Topics covered include the physics of anisotropic behavior, the role of anisotropy in imaging, anisotropy as a lithology and stress indicator, permeability and electrical properties of anisotropic porous media, and anisotropic loss mechanisms.
Catalog #285E Published 2001
https://doi.org/10.1190/1.9781560801795 SEG Members $26, List $47

Comparison of Seismic Inversion Methods on a Single Real Data Set
Robert G. Keys and Douglas J. Foster
Papers in this volume explore the potential of a variety of seismic inversion methods applied to the same data set. They cover a wide range of topics, including effects of rock properties on seismic response, preparation of seismic data for AVO analysis, and a variety of AVO and inversion methods. The papers are an extension of a 1994 SEG postconvention workshop.
Catalog #284E Published 1998
https://doi.org/10.1190/1.978156080208 SEG Members $32, List $58

VSP Interpretive Processing: Theory and Practice
Ronald C. Hinds, Neil L. Anderson, and Richard D. Kuzmiski
With more than 75 color illustrations, this book demonstrates the utility of VSP processing and interpretation. In chapter 1, “Acquisition Considerations,” the authors describe how VSP surveys differ from borehole and surface–seismic methods and define the geometries and nomenclatures used throughout the book. In chapter 2, “Integrated Interpretive Processing,” they describe the interpretive processing methodology and processing procedures applied to the VSP data incorporated into the case histories in chapters 3 through 6. The basic mathematics behind the wavefield separation, deconvolution, and far-offset processing of VSP data are reviewed in more detail in the appendix. Chapters 3 through 6 are case studies of carbonate reef and sandstone exploration plays from the western Canadian Sedimentary Basin. For each case study, the authors discuss the relevant geology and the interpretation of the existing seismic coverage prior to the drilling of the VSP well, the well results and the rationale behind recording the VSP data, the reevaluation of the surface–seismic coverage based on the VSP and associated well control, and the utility of the respective VSP survey.
Catalog #283A Published 1996, 214 pages, Paper

Seismic Anisotropy
Erling Fjaer, Rune M. Holt, and Jaswant S. Rathore
This volume contains a set of papers based on presentations given at the Sixth International Workshop on Seismic Anisotropy.
Catalog #317E Published 1996
https://doi.org/10.1190/1.9781560802693 SEG Members $26, List $47

Modern Spectral Analysis with Geophysical Applications
Markus Båth
This book provides a bibliography of the material available concerning geophysical applications of spectral analysis. There are in all 1,483 numbered references. In addition to methodical developments, this bibliography includes geophysical applications.
Catalog #281E Published 1995
https://doi.org/10.1190/1.9781560802648 SEG Members $14, List $25

Theory of Seismic Diffractions
Kamill Klem-Musatov
This book is a complete mathematical description of diffractions caused by seismic velocity discontinuities. Diffraction theory provides important physical insights into seismology and is a necessary part of describing the nature of a seismogram. The author describes elastic wave theory and relates it to the high-frequency approximations of ray theory. Particularly appealing to researchers interested in the development of the computer software for the seismic numerical modeling based on the ray approach, Klem-Musatov’s technique is suitable for programs based on asymptotic ray theory (ART). The physics of wave propagation covered in this book should help seismologists describe seismic data with general models of the earth’s interior. This book is an English translation from an earlier volume used for more than a decade by Russian seismologists.
Catalog #282A Published 1994, 430 pages, Paper
Print ISBN 978-1-56080-074-3 SEG Members $16, List $29
SEAM Phase 1: Challenges of Subsalt Imaging in Tertiary Basins, with Emphasis on Deepwater Gulf of Mexico
Michael Fehler and P. Joseph Keliber
The SEG Advanced Modeling Program (SEAM) is a collaborative industrial research effort dedicated to large-scale, geophysical numerical simulation projects. The projects are designed to provide the geosciences exploration community with earth models and simulated data that represent significant geophysical challenges of high business value to the petroleum resource industry. The Phase I project produced a deepwater subsalt earth model designed to capture much physics and realism as possible in a 3D model that was relevant to oil and gas exploration. The 3D model covers a 40 × 35 × 15 km area and includes a complex salt intrusive in a folded Tertiary basin. The primary deliverable was the seismic data set of variable density acoustic simulations consisting of 200 TB of uncompressed traces for over 60,000 shots. Also delivered to the participants were several smaller compressed subsets of these data (“classic” data sets) intended for easier handling, simpler distribution to third parties, and easier comparison of imaging tests results. This report covers how the prime objectives of Phase I were met. Details are outlined in chapters on Model Development, Numerical Design and Vendor Qualification, Acquisition Design, Production Simulations, Quality Control, and Data Storage and Distribution.

Catalog #305E Published 1989
https://doi.org/10.1190/1.9781560802389 SEG Members $14, List $25

Geophysical Signal Analysis
Enders A. Robinson and Sven Treitel
This text, an introduction to geophysical signal analysis, is concerned with the construction, analysis, and interpretation of mathematical and statistical models. In general, it is intended to provide material of interest to upper undergraduate students in mathematics, science, and engineering. Much of this book requires only a knowledge of elementary algebra. However, at some points, a familiarity with elementary calculus and matrix algebra is needed. The practical use of the concepts and techniques developed is illustrated by numerous applications. Care has been taken to choose examples that are of interest to a variety of readers. Therefore, the book contains material of interest to both geophysicists and those engaged in digital signal analysis in disciplines other than geophysics. This book is a reprint of the 1980 Prentice–Hall volume of the same title.

Catalog #333A Published 2000, 480 pages, Paper
Print ISBN 978-1-56080-104-7 SEG Members $36, List $65

Reflections of a Seismic Interpreter
Paul M. Tucker
This volume represents more than a memoir. It includes the staples of the genre—standard autobiographical information and a large number of (usually humorous) personal anecdotes. In addition, the author uses his career as a framework to provide a sense of what seismic interpreters did, and why they did it, in the first four decades of the seismic reflection era.

Catalog #315E Published 1990
https://doi.org/10.1190/1.9781560802457 SEG Members $10, List $18
Interval Velocities from Seismic Reflection Time Measurements
Peter Hubral and Theodor Krey
Over the years, ray theory has furnished the exploration geophysicist with most of the working tools for understanding and interpreting events observed on reflection seismic sections. Even today, notwithstanding the pace at which the more powerful acoustic wave theory is introducing its new tools, ray theory, in the hands of the authors, retains its preeminence for providing insights into fundamental problems in reflection seismology. Krey's earlier contributions are part of ray theory's rich heritage. Alongside C. Hewitt Dix and Hans Durbahr, he elucidated relationships between interval velocity and observed reflection moveout.
Catalog #802E Published 1980
https://doi.org/10.1190/1.9781560802501 SEG Members $20, List $36

The Generalized Reciprocal Method of Seismic Refraction Interpretation
Derecke Palmer
In this monograph, the author describes a new comprehensive method of interpretation, the generalized reciprocal method (GRM), for which many of the previously presented methods are special cases. It also has the advantage of combining many of the better features of the individual methods.
Catalog #801E Published 1980
https://doi.org/10.1190/1.9781560802426 SEG Members $10, List $18

Seismic Filtering
Translated from French by N. Rothenburg; edited by R. Van Nostrand
Sponsored by the French Petroleum Institute and of value to all seismic data processors, this tutorial symposium on seismic filtering contains seven chapters, each by a different author. Topics covered include introductions to 1D and 2D spectra, the FPI's delay-line filter, optical correlation, inverse filtering of plane waves, marine analog filtering, and seismic emission by vibrators.
Catalog #320A Published 1971
https://doi.org/11.1190/1.9781560802525 SEG Members $13, List $23

Glossary of Terms Used in Well Logging
Robert E. Sheriff
This text presents explanations and definitions of many terms currently and previously used in well logging.
Catalog #800E Published 1970
https://doi.org/10.1190/1.9781560802860 SEG Members $12, List $22

Mining Geophysics: Volume 1, Case Histories
Don A. Hansen, Walter E. Heinrichs, Ralph C. Holmer, Robert E. MacDougall, George R. Rogers, John S. Sumner, and Stanley H. Ward
Compiled and edited by the SEG Mining Geophysics Volume Committee, this volume presents authoritative information about the application of geophysical theories and techniques to mining exploration. Volume 1 covers case histories, geologic mapping by geophysical methods, search for massive sulfides, search for disseminated sulfides, and search for iron ore.
Catalog #804E Published 1966
https://doi.org/10.1190/1.9781560802709 SEG Members $20, List $36

Mining Geophysics: Volume 2, Theory
Walter E. Heinrichs, Ralph C. Holmer, Robert E. MacDougall, George R. Rogers, John S. Sumner, and Stanley H. Ward
Compiled and edited by the SEG Mining Geophysics Volume Committee, this volume presents authoritative information about the application of geophysical theories and techniques to mining exploration. Volume 2 includes theory, electrical methods, magnetic methods, and gravity methods.
Catalog #810E Published 1967
https://doi.org/10.1190/1.9781560802716 SEG Members $20, List $36

Seismic Refraction Prospecting
Albert W. Musgrave
The purpose of this refraction volume is to gather the newer techniques of refraction seismic surveying into one volume. This volume contains a series of articles written principally by members of SEG who are specialists in refraction techniques. The volume contains only new material, with a bibliography of references to all other refraction material available to the editorial committee.
Catalog #808E Published 1967
https://doi.org/10.1190/1.9781560802679 SEG Members $20, List $36

International Gravity Measurements
George P. Woollard and John C. Rose
Originally established to test reliability of the world network of first-order international gravity bases, the program was expanded to include establishment of a series of reliable pendulum gravity control measurements in North America to assure a potential accuracy of 1 mGal or better on any global series of measurements. Studies also expanded and standardized existing gravity surveys of the United States for reliable gravity anomaly maps, and evaluated reliability and gravity standards used for global work.
Catalog #807E Published 1963
https://doi.org/10.1190/1.9781560802655 SEG Members $20, List $36

Lessons in Seismic Computing
Richard A. Geyer
An elementary text and problem book containing 44 lessons in seismology arranged for selection or combination to cover the normal 36-week course, or for condensation into an 18-week course. The lessons begin without assuming more than secondary school mathematics. An elementary knowledge of calculus is desirable, though not required, for the last half of the book.
Catalog #804E Published 1959
https://doi.org/10.1190/1.9781560802563 SEG Members $20, List $36
is organized around one central topic and includes workable examples that make complex CUDA concepts easy to understand for anyone with knowledge of basic software development with exercises designed to be both readable and high-performance. For the professional seeking entrance to parallel computing and the high-performance computing community, this book is an invaluable resource, with the most current information available on the market. This book was published by Wiley, A Wiley brand.

The History of Geophysics in Southern Africa
Edited by Johan H. de Beer
Geophysics is a comparatively young science which only evolved as a distinct discipline during the 19th century. However, its phenomena (including earthquakes, tsunamis, volcanic eruptions, and lightning) has been the object of fear, curiosity, and speculation since ancient times. In this book, Johan de Beer and his research team reveal that geophysical activity in South Africa can be traced back to as early as 1488. This is a truly astonishing revelation which deserves to be firmly entrenched as part of the country’s proud history. The book also discusses the history and formation of South African geophysical institutions that made a huge and seldom acknowledged contribution to the technological development of southern Africa.

Women in the Geosciences: Practical, Positive Practices Toward Parity
Edited by Mary Anne Holmes, Suzanne O’Connell, and Kaboli Dutt
The geoscience workforce has a lower proportion of women compared to the general population of the United States and compared to many other STEM fields. This volume explores issues pertaining to gender parity in the geosciences, and it sheds light on some of the best practices that increase participation by women and promote parity. Highlights include: lessons learned from NSF-ADVANCE, data on gender composition of faculty at top earth science institutions in the United States, implicit bias and gender as a social structure, strategies for institutional change, dual career couples, family friendly policies, the role of mentoring, career advancement for women, recruiting diverse faculty, and models of institutional transformation. Although the book focuses specifically on the geosciences, the goal is to spread awareness of the best practices for gender parity in academic geoscience departments. Geoscientists, policymakers, educators, and administrators could all benefit from the contents of this book. This book was copublished by Wiley and AGU.

Professional CUDA® C Programming
John Cheng, Max Grossman, and Ty McKercher
Break into the powerful world of parallel GPU programming with this down-to-earth, practical guide. Professional CUDA® C Programming presents CUDA—a parallel computing platform and programming model designed to ease the development of GPU programming—fundamentals in an easy-to-follow format, and teaches readers how to think in parallel and implement parallel algorithms on GPUs. With examples and exercises that help you see code, real-world applications, and practice new skills, this resource makes the complex concepts of parallel computing accessible and easy to understand. Each chapter is organized around one central topic and includes workable examples that demonstrate the development process, allowing you to measure significant performance gains while exploring all aspects of GPU programming. The book makes complex CUDA concepts easy to understand for anyone with knowledge of basic software development with exercises designed to be both readable and high-performance. For the professional seeking entrance to parallel computing and the high-performance computing community, this book is an invaluable resource, with the most current information available on the market. This book was published by Wiley, A Wiley brand.
CREWES Broadband 3C-2D Seismic Data
Consortium for Research in Elastic Wave Exploration Seismology
In 1995, the Consortium for Research in Elastic Wave Exploration Seismology (CREWES) acquired a 4-km-long multicomponent broad band seismic survey over the Blackfoot oil field in Alberta, Canada. These data are ideal for low-frequency and sensor comparison research. This package includes SEG-Y format shot gathers sorted by type of geophone and component (vertical or horizontal), accompanied by observers and survey notes, stacked and migrated sections (SEG-Y), and well-log data (sonic, dipole sonic, and density logs) from the area. The data are acquired using 6-kg dynamite shots into four receiver configurations: 1C arrays, 3C (10-Hz) geophones, 3C (4.5-Hz) geophones, and 2C (2-Hz) geophones. A collection of relevant CREWES research reports and graduate theses based on these data is included.

Catalog #527A
Published 2010
SEG Members $149, List $149

CREWES BrAVO AVO & Inversion Collection
Consortium for Research in Elastic Wave Exploration Seismology
The Consortium for Research in Elastic Wave Exploration Seismology (CREWES) BrAVO CD assembles a variety of AVO and inversion resources, including 57 research reports and 18 graduate theses, joint inversion software, multicomponent seismic, and interactive Zoeppritz software. Software includes Matlab® scripts (ASCII), ProMAX® executables, and Java applets.

Catalog #340A-07
Published 2006, one CD
SEG Members $125, List $125

CREWES 3C-3D Seismic Data Set – Blackfoot
Consortium for Research in Elastic Wave Exploration Seismology
In this collection, the Consortium for Research in Elastic Wave Exploration Seismology (CREWES) makes available a key 3C-3D field data set. The data are included on two DVDs as raw vertical and horizontal shot gathers with geometry in the headers. The collection includes several other valuable components, such as stacked and migrated data, 3C VSP data, well logs, and related research reports and theses. This collection is ideal for algorithm testing, research, teaching, and 3D multicomponent interpretation.

Catalog #338A
Published 2004, two DVD
SEG Members $149, List $149

Depth Imaging of Foothills Seismic Data
Edited by Laurence R. Lines, Donald C. Lawton, and Samuel H. Gray
This book evolved from a project of the Canadian Society of Exploration Geophysicists Superfund, a fund designed to support exploration geophysics research at Canadian universities. The project’s purpose was to study the seismic depth imaging of complex geologic structures in the Canadian Foothills. This book is intended for seismic processors, interpreters, and researchers. It begins with a description of exploration problems in complex overthrust environments and then develops practical solutions in terms of migration methods and applications. The book conveys heuristic descriptions of mathematical algorithms and provides case-history applications from overthrust belts. In addition to conventional poststack and prestack depth-migration approaches, the book examines migration from topography and anisotropic migration methods while providing examples derived from model and real data sets. Because of the increasing interest in Foothills oil and gas exploration, the book should provide valuable information for practitioner and theoretician alike.

Catalog #332A
Published 1999, 384 pages, Paper
SEG Members $49, List $49

Seismic Anisotropy (5IWSA)
Edited by R. James Brown
This special issue of the Canadian Journal of Exploration Geophysics contains collected papers from the Fifth International Workshop on Seismic Anisotropy (5IWSA), held in May 1992.

Catalog #316A
Print ISSN 0844-3432
Published 1993, 398 pages, Paper
SEG Members $5, List $5

3-D MODELING SERIES
SEG/EAGE 3-D Salt and Overthrust Model
Fred Aminzadeh, Jean Brac, and Tim Kunz
This joint SEG/EAGE publication includes two 3D geologic models presented on three CDs, along with an accompanying paper that explains the project. The salt model and some accompanying synthetic data sets are presented on one CD, and the overthrust model and accompanying data sets are provided on the other two CDs. Three-dimensional model data are useful for testing 3D processing algorithms (e.g., migration, velocity analysis, multiple suppression, etc.), understanding wave propagation in a complex 3D medium, choosing proper acquisition parameters, and testing various data-compression and data-transmission techniques. They also can be used for training and for benchmarking different hardware platforms. This project is a result of collaborative efforts of geophysicists, geologists, and computer scientists from more than 50 organizations. The CDs are accessible on computers using Macintosh, UNIX, and Windows operating systems.

Catalog #551A
Print ISBN 978-1-56080-077-4
Published 1997, three CDs plus 20 pages
SEG Members $19, List $19

SEG STANDARDS
SEG Standards are available via download at seg.org/Publications/SEG-Technical-Standards.
Time-Lapse Seismic in Reservoir Management
Ian G. Jack
This DVD course, intended to appeal to a wide audience, will provide an overview of the current state-of-the-art in “time-lapse seismic” and enable participants to make decisions involving the use of this method.
Catalog #437A, DVD
SEG Members $225, List $225

Seismic Data Processing, first edition
Öz Yilmaz
Based on SEG’s best-seller, Seismic Data Processing, this set of 15 videos totaling 24 hours is a course that can be attended at the individual’s own pace. Expanded and updated from the original text, this is an excellent educational tool for practicing explorationists, academic groups, research institutions, and field crews in remote areas. The instructor, who is also the author, covers all facets of processing seismic data from all perspectives with an excellent balance in presentation. A preview package may be purchased to evaluate the video series (but is not suitable for use in training sessions). The preview includes a video containing selected topics from the series, plus a copy of the textbook.
Catalog #435C — Preview DVD
SEG Members $250, List $250
Catalog #436B —
  Complete set PAL format
SEG Members $2,150, List $2,150
  Additional sets $1,075
Catalog #436C —
  Complete set DVD
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Reflections in the Field: Commemorating the 75th Anniversary of the SEG

This DVD highlighting past, present, and future directions in geophysics and SEG’s role in fostering the science won the Association of Earth Science Editors award for best electronic geoscience publication of 2005–2006. It features interviews with more than 25 geophysicists from around the world in a wide range of applied geophysics disciplines. The DVD can be played on standard DVD players as well as on computers. Several ancillary features include a video on geophysics students, the 1985 SEG film “Seeing the Unseen,” a collection of 97 human-interest stories published in The Leading Edge since 1982, and an SEG-industry-world timeline.

Catalog #530A                          Published 2005, one DVD

DIGITAL DATA

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Single USB containing all papers presented at SEG/Denver 2014.
Catalog #521A-14 For single workstation use only
SEG Members $25, List $30

Expanded Abstracts on USB: 2013
Single USB containing all papers presented at SEG/Houston 2013.
Catalog #521A-13 For single workstation use only
SEG Members $30, List $30

Expanded Abstracts on USB: 2012
Single USB containing all papers presented at SEG/Las Vegas 2012.
Catalog #521A-12 For single workstation use only
SEG Members $20, List $30

Expanded Abstracts on USB: 2011
Single USB containing all papers presented at SEG/San Antonio 2011.
Catalog #521A-11 SEG Members $20, List $30

Expanded Abstracts on DVD: 2010
Single DVD containing all papers presented at SEG/Denver 2010.
Catalog #521A-10 SEG Members $8, List $10

Expanded Abstracts on DVD: 2009
Single DVD containing all papers presented at SEG/Houston 2009.
Catalog #521A-09 SEG Members $8, List $10

Expanded Abstracts: 2008 Las Vegas
Single CD-ROM containing all papers presented at SEG/Las Vegas 2008.
Catalog #521A-09 SEG Members $19, List $29

GEOROM® XIV
GEOROM®, the complete archive of Geophysics and The Leading Edge, is available on a single DVD-ROM. A DVD-ROM drive is required for operation. The archive wide full-text search engine works on nearly all operating systems. All papers are in PDF, and navigation is through tables of contents in HTML. Installations of Adobe Reader and a Web browser are required. The search engine and the archive documents may be run completely from the DVD or may be copied to and run from a local drive. Content includes Geophysics, 1936 – 2007, and The Leading Edge, 1982 – 2007. The product license is for single workstation use only.
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VIDEO ON DVD

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Geophysics Under Stress: Geomechanical Applications of Seismic and Borehole Acoustic Waves

Colin Sayers

This is a recording of the 2010 Distinguished Instructor Short Course (DISC) by Colin Sayers. The state of stress within the earth has a profound effect on the propagation of seismic and borehole acoustic waves; this leads to many important applications of elastic waves for solving problems in petroleum geomechanics. This course provides an overview of the sensitivity of elastic waves in the earth to the in situ stress, pore pressure, and anisotropy of the rock fabric resulting from the depositional and stress history of the rock, and introduces some of the applications of this sensitivity. The course will provide the basis for applying geophysics and rock physics solutions to geomechanical challenges in exploration, drilling, and production. Catalog #233A is the accompanying DISC book.

Catalog #759A
Published 2012, one DVD
SEG Members $50, List $91

Seismic Attribute Mapping of Structure and Stratigraphy

Kurt J. Marfurt

Seismic Attribute Mapping of Structure and Stratigraphy is a video recording on DVD of the 2009 SEG/EAGE Distinguished Instructor Short Course presented by Kurt J. Marfurt. Seismic data are incredibly rich in information, including amplitude, frequency, and the configuration or morphology of reflection events. Seismic attributes, including volumetric estimates of coherence, dip/azimuth, curvature, amplitude texture, and spectral decomposition, can greatly accelerate the interpretation of newly acquired 3D surveys as well as provide new insight into old 3D surveys. Successful use of seismic attributes requires both an understanding of seismic data quality and of sedimentary and tectonic processes. Viewers of this DVD will gain an understanding of the physical basis, geologic expression, and petrophysical calibration of seismic attributes.

Catalog #758A
Published 2010, one DVD
SEG Members $50, List $91

Reservoir Geophysics: Applications

William L. Abriel

Reservoir Geophysics: Applications is a recording of the 2008 SEG/EAGE Distinguished Instructor Short Course presented by William L. Abriel. The course covers the application and impact of seismic data on oil and gas reservoirs. The material shows how geoscientists use seismic data to determine critical reservoir characteristics in the stages of project life from delineation through secondary recovery. It describes the main business drivers of the operator and how seismic data help in addressing subsurface uncertainties for business purposes. It discusses delineation, development, production, and geophysics applications in heavy-oil and carbonate reservoirs. Catalog #231A is the accompanying DISC book.

Catalog #757A
Published 2009, one DVD
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Insights and Methods for 4D Reservoir Monitoring and Characterization
Rodney Calvert
Insights and Methods for 4D Reservoir Monitoring and Characterization is a recording of the 2005 SEG/EAGE Distinguished Instructor Short Course presented by Rodney Calvert. This course covers the application and impact of 4D monitoring for the oil and gas industry, along with some requirements, modeling, and acquisition techniques for ensuring good data and using them to diagnose various reservoir production effects and to update reservoir simulation models. The treatment is designed to provide an understanding of basic underlying principles for specialists in all geoscience disciplines and their managers. Key lessons are that nearly all models and predictions without reservoir monitoring are likely to be wrong and that 4D monitoring can be much more than a repetition of conventional 3D surveys. Better methods are available to measure small production differences sensitively. Catalog #226A is the accompanying DISC book.
Catalog #752A Published 2010, one DVD

Geostatistics for Seismic Data Integration in Earth Models
Olivier Dubrule
Geostatistics for Seismic Data Integration in Earth Models is a video recording on DVD of the 2003 SEG/EAGE Distinguished Short Course presented by Olivier Dubrule. This course will help geoscientists understand how geostatistics fits into their workflow, what tools and techniques they should use, and what added value may result. Geostatistics is now used not only in reservoir characterization but also in velocity analysis, time-to-depth conversion, seismic inversion, uncertainty quantification, and seismic data integration in earth models. The book includes sections on covariance and the variogram, heterogeneity modeling, uncertainty quantification, and geostatistical inversion. Catalog #226A is the accompanying DISC book.
Catalog #752A Published 2010, one DVD

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Insights and Methods for 4D Reservoir Monitoring and Characterization is a recording of the 2005 SEG/EAGE Distinguished Instructor Short Course presented by Rodney Calvert. This course covers the application and impact of 4D monitoring for the oil and gas industry, along with some requirements, modeling, and acquisition techniques for ensuring good data and using them to diagnose various reservoir production effects and to update reservoir simulation models. The treatment is designed to provide an understanding of basic underlying principles for specialists in all geoscience disciplines and their managers. Key lessons are that nearly all models and predictions without reservoir monitoring are likely to be wrong and that 4D monitoring can be much more than a repetition of conventional 3D surveys. Better methods are available to measure small production differences sensitively. Catalog #226A is the accompanying DISC book.
Catalog #752A Published 2010, one DVD

Geostatistics for Seismic Data Integration in Earth Models
Olivier Dubrule
Geostatistics for Seismic Data Integration in Earth Models is a video recording on DVD of the 2003 SEG/EAGE Distinguished Short Course presented by Olivier Dubrule. This course will help geoscientists understand how geostatistics fits into their workflow, what tools and techniques they should use, and what added value may result. Geostatistics is now used not only in reservoir characterization but also in velocity analysis, time-to-depth conversion, seismic inversion, uncertainty quantification, and seismic data integration in earth models. The book includes sections on covariance and the variogram, heterogeneity modeling, uncertainty quantification, and geostatistical inversion. Catalog #226A is the accompanying DISC book.
Catalog #752A Published 2010, one DVD

Understanding Seismic Anisotropy in Exploration and Exploitation
Leon Thomsen
All rock masses are seismically anisotropic, but we generally ignore this in our seismic acquisition, processing, and interpretation. The anisotropy nonetheless does affect our data, in ways that limit the effectiveness with which we can use it, as long as we ignore it. This DVD, produced for use with the fifth SEG/EAGE Distinguished Instructor Short Course, helps us understand why this inconsistency between reality and practice has been so successful in the past and why it will be less successful in the future as we acquire better seismic data (especially including vector seismic data) and correspondingly higher expectations of it. This recording includes Leon Thomsen’s entire presentation combining audio, video, PowerPoint, and transcript. An interactive exercise graphically illustrates the relations among the anisotropy parameters.
Catalog #751A Published 2007, one DVD

Seismic Amplitude Interpretation
Fred J. Hilterman
This is a computer-based, interactive presentation of the 2001 SEG/EAGE Distinguished Instructor Short Course, “Seismic Amplitude Interpretation.” During the last 30 years, seismic interpreters routinely have applied bright-spot and AVO technology for recognizing prospects and predicting lithology. New amplitude attributes were added to this technology as new exploration problems were defined. R & D continues in the field of amplitude interpretation, especially when E & P costs escalate as more severe environments are explored, such as ultradeepwater plays. With the high interest in reducing exploration risk, this course addresses the methodology of an amplitude interpretation and the subsequent benefits and limitations that one can expect in various rock-property settings. This book begins with a review of the relationships between rock properties and geophysical observations. Practical problems illustrate the assumptions and limitations of commonly used empirical transforms, and procedures for conducting and verifying fluid-substitution techniques are presented. The book identifies components of the seismic response best suited for differentiating pore fluid from lithologic effects. Field examples emphasize what combination of seismic signatures should be expected for different rock-property environments. To help select the best seismic attribute for calibrating amplitude to rock properties, general rules are provided for predicting AVO responses and interpreting lithology from observed responses. A case history also is provided. The last part examines the numerous amplitude attributes that can be extracted from seismic data to quantify an interpretation. Benefits and limitations of these attributes in soft- to hard-rock environments are discussed with model data and in case histories. Catalog #224A is the accompanying DISC book.
Catalog #750A Published 2004, one DVD

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