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, as well as crustal studies; and key papers on diffraction imaging.

Elements of 3D Seismology, third edition
Coding and Decoding Seismic Data: The Concept of Multishooting, Volume One. Second Edition, offers a thorough investigation of modern techniques for collecting, simulating, and processing multishooting data. Currently, the acquisition of seismic surveys is performed as a sequential operation with the three basic acquisition steps usually performed separately, one after the other. The cost of performing various shots separately is almost identical to that of one shot. Thus, the benefits of using the multishooting approach for computing seismic surveys are enormous. By using this approach, the long-standing problem of simulating a three-dimensional seismic survey can be reduced to a matter of weeks. Providing both theoretical and practical explanations of the multishooting approach, including case histories, this book is an essential resource for exploration geophysicists and practicing seismologists. Investigates how to collect, simulate, and process multishooting data. Addresses the improvements in seismic characterization and resolution that can be expected from multishooting data. Provides information for the oil and gas exploration and production business that will influence day-to-day surveying techniques. Covers robust decoding methods of undersampled data, nonlinear decoding, the use of constraints in decoding processes, and nonlinear imaging of undersampled data. Includes access to a companion site with answers to questions posed in the book.

Quantitative Seismic Interpretation

The first edition of this book was a slightly modified version of my dissertation (defended in February 2001). This second edition has been extended considerably. Many technological developments of the past 10 years have been included. Feedback from students attending my course on 3D seismic interpretation has helped to clarify and add to some of the discussions in the book. Another major difference in this edition is the inclusion of many new figures copied from the literature. Most of the existing figures have been redrawn to comply with the high standards used for figures in Geophysics, and all references are now compiled in a single list. Although the main text for this edition was ready by the end of 2010, some developments in the field of seismic acquisition and processing that occurred in 2011 and 2012 have still been included. The ideas and results discussed in this book should help one to achieve a better understanding of the structure of 3D acquisition geometries. With this understanding, geophysical requirements can be satisfied with an optimal choice of acquisition geometry and its parameters. Processing techniques can be adapted to honor and exploit the specific requirements of each geometry, especially orthogonal and areal geometries, leading to a more interpretable and producible result.

Aapg Memoir 42, 6th Edition: Interpretation of Three-Dimensional Seismic Data, Sixth Edition

Quantitative Seismic Interpretation demonstrates how rock physics can be applied to predict reservoir parameters, such as lithologies and pore fluids, from seismically derived attributes. The authors provide an integrated methodology and practical tools for quantitative interpretation, uncertainty assessment, and characterization of subsurface reservoirs using well-log and seismic data. They illustrate the advantages of these new methodologies, while providing advice on limitations of the methods and practical pitfalls. This book is aimed at graduate students, academics and industry professionals working in the areas of petroleum geoscience and exploration seismology. It will also interest environmental geophysicists seeking a quantitative subsurface characterization from shallow seismic data. The book includes problem sets and a case-study, for which solutions and worked examples are provided on the companion website (http://www.cambridge.org/9780521816014). These resources will allow readers to gain a hands-on understanding of the methodologies.

Concepts and Applications in 3D Seismic Imaging

Seismic Data Interpretation and Evaluation for Hydrocarbon Exploration and Production

Interpretation of Three-dimensional Seismic Data

Active geophysical monitoring is an important new method for studying time-evolving structures and states in the hyperactively active Earth’s lithosphere. It is based on repeated time-lapse observations and interpretation of rock-induced changes in geophysical fields periodically excited by controlled sources. In this book, the results of strategic systematic development and the application of new technologies for active geophysical monitoring are presented. The authors demonstrate that active monitoring may drastically change solid Earth geophysics, through the acquisition of substantially new information, based on high accuracy and real-time observations. Active monitoring also provides new means for disaster mitigation, in conjunction with substantial international and interdisciplinary cooperation. Introduction of a new concept: Most experienced authors in the field Comprehensive.

Active Geophysical Monitoring

Interpretation of Three-dimensional Seismic Data

Acquisition and Processing of Marine Seismic Data demonstrates the main principles, required equipment, and suitable selection of parameters in 2D/3D marine seismic data acquisition, as well as theoretical principles of 2D marine seismic data processing and their practical implications. Featuring detailed datasets and examples, the book helps to relate theoretical background to real seismic data. This reference also contains important QC analysis methods and results for data acquisition and marine seismic data processing. Acquisition and Processing of Marine Seismic Data is a valuable tool for researchers and students in geophysics, marine seismics, and seismic data, as well as for oil and gas exploration. Contains simple step-by-step diagrams of the methodology used in the processing of marine data to demonstrate the theory behind the applications. Combines theory and practice, including extensive noise, QC, and velocity analyses, as well as examples for beginners in the seismic operations market. Includes simple illustrations to provide an easy understanding of the theoretical background. Contains enhanced field data examples and applications.

A Subsurface Interpretation Using Three-dimensional Seismic Methods of a Portion of the Erwan Gas/Condensate Field, Gulf of Thailand

3D Seismic Imaging

Elements of 3D Seismology, third edition is a thorough introduction to the acquisition, processing, and interpretation of 3D seismic data. This third edition is a major update of the second edition. Sections dealing with interpretation have been greatly revised in accordance with improved understanding and availability of data and software. Practice exercises have been added, as well as a 3D seismic survey design exercise. Discussions include: conceptual and historical foundations of modern reflection seismology; an overview of seismic wave phenomena in acoustic, elastic, and porous media; acquisition principles for land and marine seismic surveys; methods used to create 2D and 3D seismic images from field data; concepts of dip moves, prestack migration, and depth migration; concepts and limitations of 3D seismic interpretation for structure, stratigraphy, and rock properties; fracture and fault interpretation, and the interpretation of machine-learned attributes, impedence estimation, and AVO. This book is intended as a general text on reflection seismology, including wave propagation, data acquisition, processing, and interpretation and will be of interest to entry-level geophysicists, experts in related fields (geology, petroleum engineering), and experienced geophysicists in one subfield wishing to learn about another (e.g., interpreters wanting to learn about seismic waves or data acquisition).

Three-dimensional Seismic Interpretation, Southern Ship Shoal, Gulf of Mexico

Seismic Diffraction

A Three-dimensional Seismic Interpretation of a Triangle Thrust Zone, Sublette County, Wyoming

Interpretation of Three-dimensional Seismic Data
First Steps in Seismic Interpretation

Interpretation of Three-Dimensional Seismic Data, Seventh Edition

Geovolunteering Visualization and Interpretation of Three-dimensional Seismic Data. Jackson County, Ohio

Seismic Geomorphology

3-D seismic data have become the key tool used in the petroleum industry to understand the subsurface. In addition to providing excellent structural images, the dense sampling of a 3-D survey makes it possible to map reservoir quality and the distribution of oil and gas. Topics covered in this book include basic structural interpretation and map-making; the use of 3-D visualisation methods; interpretation of seismic amplitudes, including their relation to rock and fluid properties; and the generation and use of AVO and acoustic impedance datasets. This new paperback edition includes an extra appendix presenting new material on novel acquisition design, pore pressure prediction from seismic velocity, elastic impedance inversion, and time lapse seismic. Written by professional geophysicists with many years' experience in the oil industry, the book is indispensable for geoscientists using 3-D seismic data, including graduate students and new entrants into the petroleum industry.

Practical Seismic Data Analysis

Öz Yilmaz has expanded his original volume on processing to include inversion and interpretation of seismic data. In addition to the developments in all aspects of conventional processing, this two-volume set represents a comprehensive and complete coverage of the modern trends in the seismic industry from time to depth, from 3-D to 4-D, from 4-D to 4-C, and from isotropy to anisotropy.

Coding and Decoding: Seismic Data

Currently, the acquisition of seismic data is performed as a sequential operation in which shots are computed separately, one after the other. This approach is similar to that of multiple-access technology, which is widely used in cellular communications to allow several subscribers to share the same telephone line. The cost of performing various shots simultaneously is almost identical to that of one shot. Thus, the savings in time and money expected from using the multishooting approach for computing seismic surveys compared to the current approach are enormous. By using this approach, the long-standing problem of simulating a three-dimensional seismic survey can be reduced to a matter of weeks and not years, as is currently the case. By investigating how to collect, simulate, and process multishooting data, addresses the improvements in seismic characterization and resolution one can expect from multishooting. Our aim is to educate the oil and gas exploration and production business of the benefits of multishooting data, and to influence their day-to-day surveying techniques.

Three-Dimensional Seismic Interpretation Over Pladang Structure, Gulf of Thailand

We are poised to embark on a new era of discovery in the study of geomorphology. The discipline has a long and illustrious history, but in recent years an entirely new way of studying landscapes and seascapes has been developed. It involves the use of 3D seismic data. Just as CAT scans allow medical staff to view our anatomy in 3D, seismic data now allows Earth scientists to do what the early geomorphologists could only dream of - view tens and hundreds of square kilometres of the Earth's subsurface in 3D and therefore see for the first time how landscapes have evolved through time. This volume demonstrates how Earth scientists are starting to use this relatively new tool to study the dynamic evolution of a range of sedimentary environments.

3-D Seismic

A velocity model can have enduring and growing interpretive value, beyond its initial creation to optimize the seismic image. The 3D velocity model is often 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 book becomes an increasingly effective interpretive tool. This book, first published for use with the SEG/EAGE second Distinguished Instructor Short Course, addresses the 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 prove invaluable to interpreters 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.

Three-dimensional Seismic Interpretation and Turbidite Reservoir Characterization of the Viking Group in Block 35/11 in the NE North Sea

This book introduces readers to the field of seismic data interpretation and evaluation, covering themes such as petroleum exploration and high resolution seismic data. It helps geoscientists and engineers who are practitioners in this area to both understand and to avoid the potential pitfalls of interpreting and evaluating such data, especially the over-reliance on sophisticated software and workstations and the lack of proper input. The elements of geology and geophysics. Chapters elaborate on the necessary principles, from topics like seismic wave propagation and rock-fluid parameters to seismic modeling and inversion, explaining the need to understand geological implications. The difference between interpretation of data and its evaluation is highlighted and the author encourages imaginative, logical and practical application of knowledge. Readers will appreciate the exquisite illustrations included with the accessibility written text, which simplify the process of learning about interpretation of seismic data. This multidisciplinary, integrated and practical approach to data evaluation will prove to be a valuable tool for students and young professionals, especially those connected with oil companies.

Three-dimensional Seismic Modeling

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, which accompanies 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.

2-D Seismic Interpretation

This book demystifies that art and science of seismic interpretation for those with and without formal geophysical training. From geologists to managers and investors, The Art and Science of Seismic Interpretation is a guide to what seismic data is, how it is interpreted, and what it can deliver.

Seismic Stratigraphy, Basin Analysis and Reservoir Characterisation

The oil and gas business has witnessed over the past decade a quantum leap in effectiveness of geophysics in E & P operations. Indeed the industry may never before have witnessed a technological advance as profound as or with the overwhelming business impact of 3-D seismic.