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Seismic Data Analysis Techniques in Hydrocarbon Exploration

Seismic Data Analysis Techniques in Hydrocarbon Exploration: Enweozu Onajite 2013-09-26 Seismic Data Analysis Techniques in Hydrocarbon Exploration is an introduction to the concepts and skills required for processing seismic data in the oil industry and the step-by-step techniques necessary to extract the sections that trap hydrocarbons as well as seismic data interpretation skills. It enhances the ability to interpret seismic data and use that data for basin evaluation, structural modeling of a fault, reservoir characterization, rock physics analysis, field development, and production studies. Understanding and interpreting seismic data is critical to oil and gas exploration. Many men and women work with seismic data in the oil industry, and there is a potential for job growth. In the book, the author describes the basic concepts and techniques used to interpret seismic data, including practical methodologies for estimating them from seismic data. This is an introduction to the concepts and skills required for processing seismic data in the oil industry and the step-by-step techniques necessary to extract the sections that trap hydrocarbons as well as seismic data interpretation skills. It enhances the ability to interpret seismic data and use that data for basin evaluation, structural modeling of fault, reservoir characterization, rock physics analysis, field development, and production studies.

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Seismic Data Processing: A Quick Overview / Examination of A Real Seismic Data Set / Quality Control of Real seismically derived attributes. The authors provide an integrated methodology and practical tools for quantitative seismic interpretation, clarifying the objectives and approaches toward better precision in seismic prospecting. It provides innovative topics as wave motion; digital imaging; digital filtering; various visualization aspects of the seismic reflection methods in popular use today go back to the work of some of the great scientists of past centuries. The ideas are presented in an accessible form. The book is designed to meet the needs of both the academic and industrial worlds. University students and employees of oil-exploration companies alike will find this book to be a valuable resource.

Illustrated Seismic Processing—Stephen J. Hill

Seismic Hydrocarbon Exploration—Hamid N. Alshib 2016-08-26 This book presents the essential principles and applications of seismic oil-exploration techniques. It concisely covers all stages in exploration activities (data field acquisition, data processing and interpretation). Supplementing the main text with a wealth of over 300 illustrations and figures, the book focuses on the physics of the applied principles, avoiding intricate mathematical derivations and treating it mainly as an introductory and background text. The book concentrates on the physics of the applied principles, avoiding intricate mathematical derivations and treating it mainly as an introductory and background text. The book concentrates on the physics of the applied principles, avoiding intricate mathematical derivations and treating it mainly as an introductory and background text.

Seismic Data Processing with Seismic Attributes—David R. Forsl 2005 This book can be used as a primer to Seismic Attributes by those who may or may not be familiar with seismic processing using other software packages. Real data sets—including one from a deepwater survey—are provided on accompanying CD-ROMs. Seismic Attributes is an online resource for the Center for Wave Phenomena at Colorado School of Mines.

Covariance Analysis for Seismic Signal Processing—R. Lynn Kirch 1999 This volume provides a single source of foundational knowledge in reflection seismology principles and theory. Reflection seismology has a broad range of applications and is used primarily by the oil and gas industry to provide high-resolution images and build a coherent image from maps of processed seismic reflections. Combined with seismic attribute analysis and other exploration geophysics tools, it aids geologists and geophysicists in creating geopetroleum models of areas of subsurface interest. The book begins with an overview of reflection seismology, followed by a discussion of how to interpret the seismic information generated by the source. It shows how to use the information to identify and map geological features, and how to interpret the data to identify potential reservoirs. It also explores the range of applications for which reflection seismology is used, from exploration and production to environmental monitoring. It concludes with a discussion of current research trends and future directions in reflection seismology, helping to emphasize the importance of the data analysis to interpreters using common geophysical techniques to assess the potential of a reservoir. The book offers a detailed discussion of the data analysis techniques used to interpret seismic data, and provides examples of how to apply these techniques to real-world data. It also covers the latest advances in data analysis, including machine learning and artificial intelligence, and provides a wealth of practical examples and case studies to help readers apply the techniques to their own data. It is an essential resource for geologists and geophysicists working in the oil and gas industry, as well as those working in other fields where reflection seismology is used.
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, curvatures, 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 multiattribute 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.

First Steps in Seismic Interpretation

Donald A. Herron 2011