PetroSkills

Seismic Imaging of Subsurface Geology - SSD

COURSE

About the Course

This course is designed for those working with reflection seismic data to understand and appreciate the underlying principles and processes leading to final images and associated attributes. Basic seismic imaging principles and techniques are introduced at the outset of the class to establish the purpose, underlying principles, parameterization, and limitations of the various processing steps leading to final seismic images provided by current state-of-the-art imaging techniques. The course focuses on 3D seismic data.

By the end of the course, the participant will understand and appreciate the many steps leading to final interpretable images and will be able to recognize possible problems introduced or not mitigated by the processing flow. Moreover, the participant will understand how seismic acquisition and data processing steps affect seismic amplitudes to assess their validity as input to various post-imaging seismic attribute and inversion processes. The lectures are complemented by many case-history examples, hands-on exercises and real-time data processing examples. Although mathematics is kept to a minimum, some understanding of 1D and 2D filtering is helpful.

Course participants are encouraged to bring their own data examples for individual and group discussions. The material covered in this course provides essential basics to intermediate and specialized geophysics courses such as AVO Inversion and Attributes, Seismic Attributes for Reservoir Characterization and Applied Seismic Anisotropy for Fractured Reservoir Characterization. Those who have had limited prior exposure to seismic data should consider taking Basic Geophysics for an introduction prior to taking this course.

"The knowledge of the instructor was beyond any questions asked. All questions were easily and thoroughly answered." - Geologist, Midland, United States

"The instructor was very interested in helping students understand, and was very effective at explaining complicated ideas in basic ways." - Geotech, Houston, United States

Target Audience

Seismic interpreters, geophysicists, geologists, and exploration team members who use seismic data and need to understand the purpose and implications of the data acquisition and processing steps that lead to the final seismic images and derivative attributes. Also, the course is appropriate to early-career processing geophysicists seeking a rigorous foundation of the principles of data processing and seismic imaging.

You Will Learn

Participants will learn how to:

- Assess and determine data processing flows for a variety of acquisition and reservoir scenarios
- Determine the most cost-effective imaging or migration technique given acquisition and structural scenarios
- Recognize various noises and how best to mitigate them
- Assess and appreciate the sensitivity of data processing parameters on final images
- Estimate the vertical and lateral resolution of the processing and attribute products
- Understand and examine data acquisition and processing quality control displays
- Ask appropriate questions during data processing steps
- Communicate effectively with specialists in seismic data acquisition, processing, and interpretation
- Appreciate and evaluate the trade-offs between costs, turn-around time, and sophistication of processing and imaging steps

Course Content

- Review of basics of reflection seismology: wave propagation and seismic amplitudes
- Seismic imaging techniques and principles
- Overview of 3D seismic data acquisition and quality control
- Improving seismic resolution: deconvolution, inverse-Q filtering, and spectral whitening
- Velocity estimation, velocity field building, and velocity uncertainty implications
- Near-surface problems and solutions: seismic datums and statics corrections
- Noise identification and suppression: coherent noises, multiples, linear noises, and incoherent noises
- Advanced seismic imaging techniques: pre-stack time and pre-stack depth migration
- Migration velocity analysis techniques

Product Details

Categories: Upstream

Disciplines: Geophysics

Levels: Foundation

Product Type: Course

Formats Available: In-Classroom

Instructors: PetroSkills Specialist