

Advanced Seismic Data Acquisition & Processing



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Introduction:

O&G exploration is a series of capital-intensive activities, where data results are continuously affecting succeeding operations from the onset. It is only necessary that even from the initial stage of seismic surveying and processing, explorationists must acquire good data sets, as these consequently affect further subsurface evaluation and other E&P business decisions later on.

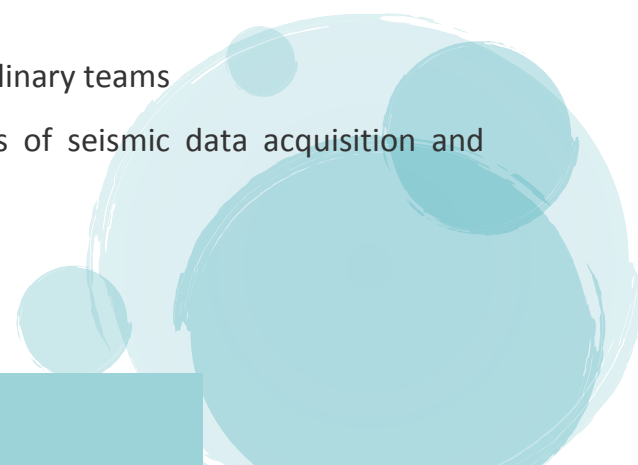
This course will cover both seismic acquisition procedures as well as data processing methodologies in application to various complex environments and case studies. They will learn the tools available in the industry to ensure quality control on the conduct of the survey and the type of data acquired. Theories will be presented along with practical exercises on situational cases in application of the core skills of data acquisition. Delegates will also learn about the best practices and the new technologies available for seismic data acquisition and how this can be applied to their own operations.

Furthermore, delegates will be able to choose an optimal processing workflow with interrelated processing steps and parameters, all impacting the resulting data quality, cost and time to delivery. They will gain a sound knowledge of processing theory and current best practices in data processing. Specialized cases of various complex environments will be provided. Advanced processing methods focus on specialized studies involving data integration of geological details, well logging data, and petro physical data.



All steps in the workflow are discussed with an eye to the theoretical foundation, alternative implementations, assumptions, strengths and weaknesses, critical parameter choices and QC aspects. They will have the basic knowledge to execute a seismic processing project under experienced supervision. They can entertain a meaningful dialogue with contractors to select an optimal processing flow and parameters, and can exercise basic QC. Attendees can better liaise and collaborate with staff in neighboring Geoscience sub-disciplines to better relay data information.

Objectives:

- UNDERSTAND the mechanisms of data acquisition in order to supervise or advise on the workflow execution and surveying methodology
 - ENSURE quality assurance and quality control either as a supervising authority of the acquisition method or as an end user of the data sets
 - CALCULATE the value of a seismic survey and the value of information (vs. how much you are willing to spend on new seismic information)
 - GAIN a working understanding of a representative set of processing methods, which they may supervise or carryout themselves
 - ACCOUNTABLE for the geophysical input for multi-disciplinary teams
 - UNDERSTAND the principles, practices, and limitations of seismic data acquisition and processing
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Who should attend?

Exploration Geophysicists and Geologists involved in seismic acquisition and processing. Good processing is an integrated effort so the course is also targeted at those who contribute to the processing workflow and parameter selection, be it hands-on or in supervising processing done by others.

- Exploration Geophysicists/ Geoscientists
- Exploration Geologists (Seismic Interpretation)
- Seismic Interpreters & Geomodellers (End Users)
- E&P Managers
- Professionals who have been allocated crisis management tasks yet have had insufficient time to devote to the subject

Course Outline:

DAY 1: Key Principles in Data Acquisition

- Foundation Principles in Data Acquisition
 - Quality Assurance & Quality Control of Data
 - Surveying Best Practices
 - Sources, Detectors, and Instruments
 - Exercise: Wave Propagation (Snellius, Huygens, Fermat), Data Aliasing in Time
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DAY 2: Survey Design & Execution

- Survey Design & Execution
- Repeatability and Efficiency (OBS Methods, Cost Aspects, Multi-Streamers, Surveying Optimization Methods)

DAY 3: Data Preparation & Pre-Processing

- Overall Workflow of Data Processing
- Problems and Remedies to Data Pre-Processing
- Developments in Data Acquisition Geometries & Hardware

DAY 4: Advanced Data Processing

- Velocity Analysis
 - Anisotropy
 - Velocity Model Building and Updating using Time and Depth Migration
 - Novel Migration Solutions
 - AVO (Amplitude vs Offset) and AVA (Amplitude vs Angle)
 - Inversion Methods
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DAY 5: Data Processing & Interpretation

- Workflow from Data Processing to Interpretation
- Case Study Discussions