Reservoir Characterization

A Paradigm Geoscience Data Service

Conventional reservoirs continue to play a key role in the oil and gas E&P industry. Most of the oil fields in the world can benefit from some degree of reservoir characterization. Since at times the "signal" separating a good from a poor quality reservoir can be subtle, a robust and rigorous approach should always be taken. Realizing the full potential of these opportunities rests in the ability to predict the quality of the reservoir and the presence of hydrocarbons.

The Paradigm Geoscience Data Services team provides solutions for reservoir characterization that reduce risk on the initial well and improve estimate of the distribution of reservoir and pore fluids on subsequent wells. This is performed using a combination of advanced technologies, such as amplitude-preserving, angle domain migration, forward modeling of available well data, model-based AVO(A) analysis, and elastic inversion. Beyond the first well, we use our integrated visualization and model-building solutions to quickly and effectively create a better understanding of the discovery, allowing you to appraise the opportunity more quickly and reduce the time to first oil.

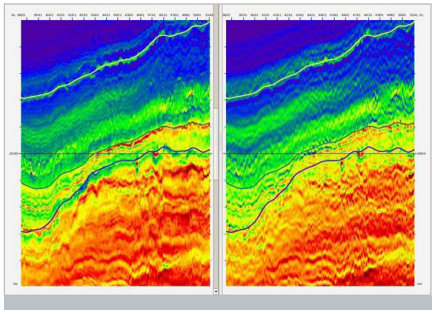
Paradigm Reservoir Characterization Solutions

- **Amplitude compliant data conditioning**. Enhanced signal quality preserving relative amplitude of the pre stack data, including customized noise suppression (LIFT) workflows that do not disturb the signal.
- **Broadband processing.** A novel approach to source and receiver deghosting using recursive filtering, an ideal pre-requisite for seismic inversion and thin bed detection.
- **Amplitude compliant imaging**: The Paradigm EarthStudy 360® full-azimuth angle domain imaging and analysis system explicitly calculates the angle as part of the migration operator. This gives a far more reliable measurement and provides accurate input for AVO and inversion.
- **Forward modeling:** Paradigm gains valuable insight by performing forward modeling of available wells in the area. This helps us narrow in on the types of attributes that we will want to test on the actual data. Forward modeling is performed in both the acoustic and elastic domains with and without fluid substitution modeling.
- **Rock property attribute generation.** The Paradigm software suite includes a rich offering of rock property related attributes, from Lambda-rho/mu-rho AVO related attributes to Vp, Vs, and Rho from our elastic inversion suite. This suite includes simultaneous angle stack and full prestack gather inversion solutions.
- **Interpretation and modeling:** Some of the industry's most popular interpretation solutions (e.g. SeisEarth® and VoxelGeo®) are used to analyze inversion results for target lithologies and direct hydrocarbon indicators. This affords the interpreter additional options to find and rank prospects more quickly, even in the most challenging areas. It also allows Paradigm Services professionals to work remotely from its customers while sharing the same views and perspectives of the reservoir. Elastic property volumes can be moved to the industry's most popular reservoir modeling systems, including Paradigm SKUA-GOCAD™, to merge these properties with structural and stratigraphic (facies) frameworks.

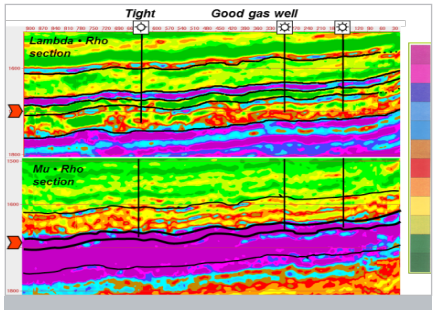
Paradigm Reservoir Characterization Advantages

The Paradigm Geoscience Data Services team offers a flexible approach to designing the appropriate fit-for-purpose workflow and identifying the key attributes needed to unlock your reservoir's potential.

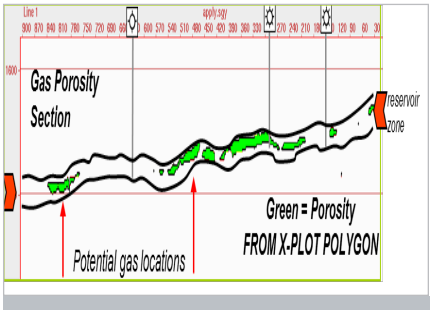
AVO and inversion



Elastic properties



Reservoir properties



▲ P impedance and S impedance results of seismic inversion, which guide the detection of prospective zones as well as the calculation of elastic properties like Lambda-Rho and Mu-Rho, to help characterize the lithology and fluid of the reservoir.

Paradigm®