

Interwell

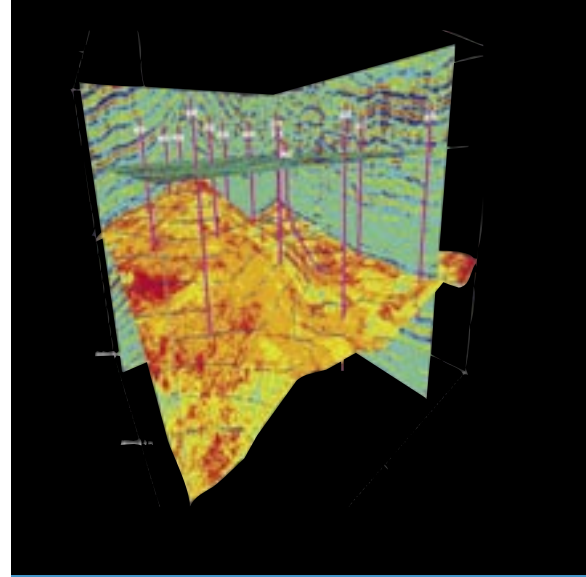
Seismic GeoInversion

RML-InterWell provides the ability to include geologic constraints in seismic inversion thanks to the integration of geomodeling technology with advanced inversion algorithms.

Seismic inversion techniques are widely used as the first step in seismic reservoir characterization. They produce images of the reservoir with increased resolution and significantly reduced noise. Structural and stratigraphic data are an efficient means for constraining the inversion process, generating geologically consistent impedance distributions, which in turn are particularly well adapted for inferring further reservoir properties from seismic, using seismic facies analysis or quantitative reservoir property estimations.

RML-InterWell takes advantage of the most recent geomodeling concepts to generate optimized impedance volumes that integrate reservoir structure (whatever the fault network) and stratigraphy.

The inversion approach implemented in RML-InterWell has the unique ability of weighing the relative confidence you have in the seismic data and the geology (well data). This approach ensures that only reliable information is incorporated into the inversion results, and prevents the introduction of seismic noise into final impedance models.



RML-INTERWELL BENEFITS FROM:

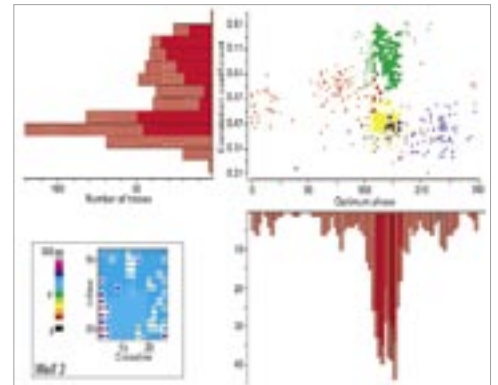
- Robust multi-well wavelet estimation workflows;
- Flexible structural modeling based on interpreted horizons and faults;
- Enhanced resolution of spatial heterogeneity and integration of geological information thanks to a multi-channel inversion technique.

WELL-TO-SEISMIC CALIBRATION

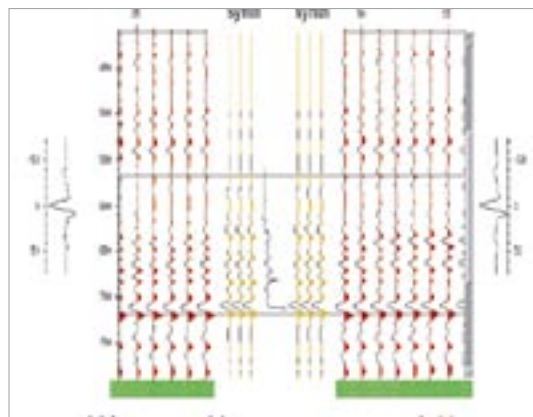
Well-to-seismic calibration is aimed at extracting a wavelet that ensures an optimal match between the synthetic seismograms and the neighboring seismic traces at each well location. Accurate seismic calibration is essential to obtain quantitative impedance results. RML-InterWell offers a unique step-by-step methodology for extracting optimized wavelets from 3D cubes and using all the available wells at the same time.

RML-InterWell's wavelet estimation module offers a wide set of tools that help users to make the best decision, with the highest possible level of confidence:

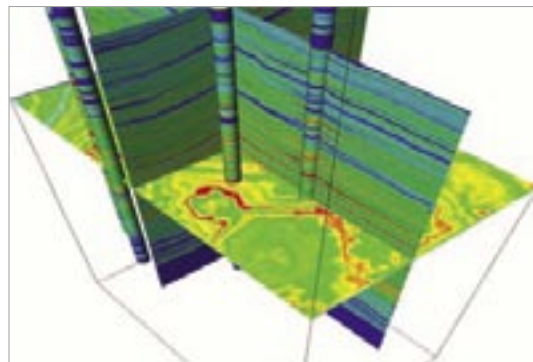
- Single well and multiple well statistics;
- Mapping of estimated parameters in the vicinity of wells;
- Ability to model inter-bed multiples in the impulse response.



Common phase detection



Final calibration



A priori model (Courtesy GDS)

RESERVOIR PROPERTY ESTIMATION

RML-InterWell's geological calibration module derives reservoir property maps and/or cubes calibrated at wells from inversion attributes.

CPS3, Z-Map+, Isatis and gOcad are registered trademarks respectively of Schlumberger, Landmark Graphics, GeoVariances, Earth Decision Sciences.

INITIAL GEOLOGICAL MODELING

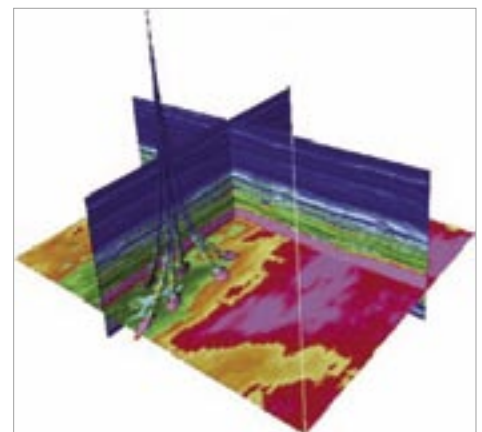
RML-InterWell generates a geologically consistent initial impedance model that is used as an input and as a constraint in the inversion process. The modeling procedure makes rigorous use of advanced geomodeling concepts, which allow it to handle any type of faulting (normal and reverse) and any stratigraphic features (including erosion).

In addition to import/export functions with most seismic interpretation systems, RML-InterWell reads and writes gOcad, Zmap+, CPS3 and Isatis formats.

INVERSION

The inversion algorithm implemented in InterWell uses a multi-trace approach that controls lateral impedance variation along correlation surfaces defined in the initial model. The inversion parameters control the uncertainties associated to the seismic amplitudes, the seismic interpretation, and the stratigraphic model:

- The noise-to-signal ratio is directly linked to the uncertainty associated to the seismic. This parameter influences the confidence one can have in the seismic data.
- The acoustic impedance standard deviation weighs the confidence associated with the initial model. This parameter allows tuning of the amount of seismic information to be incorporated in the final impedance model.
- The correlation length controls the lateral continuity of the impedance distribution, as well as the confidence in the seismic interpretation. In other words, RML-InterWell's inversion applies a stratigraphic-oriented filter, which is suitable for reservoir interpretation and characterization.



Inversion