VIALOGY®
REDEFINING SEISMIC℠

What we do

ViaLogy pulls a new level of information from conventional seismic data that enables far more accurate reservoir characterization. We don't say this lightly. Our proprietary technology builds on the work of NASA scientists and others published in hundreds of peer-reviewed journal articles (see Selected References) in fields as diverse as radar interferometery, medical diagnostics, and intelligence analysis.

The key is active signal processing of seismic data; ViaLogy applies proprietary software that adds a synthetic signal to the seismic processing and analysis sequence. C onventional seismic processing seeks to eliminate noise that typically obscures a signal; Vialogy software both uses inherent seismic noise in the data and creates additional synthetic noise to extract the signal of interest.

ViaLogy is extracting information from conventional seismic data for reservoir characterization using interferometric active signal processing based upon quantum mechanics. To understand how, it helps to understand the technology's heritage.

How was QuantumRD® Developed?

Our QuantumRD® is a game-changing advance in seismic analysis that follows the long tradition of recognizing the value of information (signal) in previously discarded measurements (noise). The technology has its origin in efforts to detect and characterize weak signals and solve remote sensing problems that appeared unsolvable. For example, how can remote sensing data be used to determine chemical or mineral characteristics of other planets; how can satellite or airborne radar data be used to remotely detect a subsurface tunnel; or the movement of a tank under a dense tree canopy?

This work has led to some insightful conclusions:

- ☐ The signal is coupled to the noise surrounding it.
- ☐ A weak signal can be mapped by detecting changes in the noise.
- ☐ Quantum mechanics provides the computational tools to detect these changes in noise.

So how do we separate signal and noise?

Seismic data can be thought of as a combination of (1) signal + (2) coherent noise + (3) other noise (not understood signal.) Through a mathematical process applying quantum resonance, meaning we can isolate the information buried in "noise."

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Unlike conventional techniques, we neither suppress noise nor do we produce a noise volume that is isolated from signal. We exploit the coupling between changes in the signal and changes in the noise using interferometery. A standard radar technique, interferometery can be thought of as the interaction between a designed wavefront and the object it is trying to detect (such as an aircraft, in the case of radar) that creates another wavefront. The interference of these two wavefronts produces a new wavefront which provides a new basis for detection.

QuantumRD uses interferometery in seismic data by introducing a virtual (or synthetic) vibration to the analysis and processing sequence. This is a non-linear quantum stochastic energy source that re-explores the seismic data by creating resonances through the interaction between the virtual vibration and the seismic data. Changes in resonance yield new information that cannot be extracted from the seismic by linear process. The signature of these changes in resonance can then be determined and calibrated as porosity or fluid or lithology. Reservoir characterization can then be made on the resulting volumes of reservoir property. On this basis, we predict porosity, fluid presence and geobodies (formations showing connectivity and the consistency of attributes) and we combine these into a deliverable resource model.

We detect signature changes (a signature is a pattern in the data indicative of a physical property; a marker) in reservoir porosity, fluid presence and lithologies within conventional 3-D seismic data.

Selected References

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