

The HorizonCube

One of the single biggest challenges in seismic interpretation today is maximising the value of your geological data. Too often, however, generalised geological models are built with a limited number of mapped horizons and gigabytes of data that are ultimately reduced to just a few kilobytes of interpreted data. The result is that potentially valuable seismic information is lost.



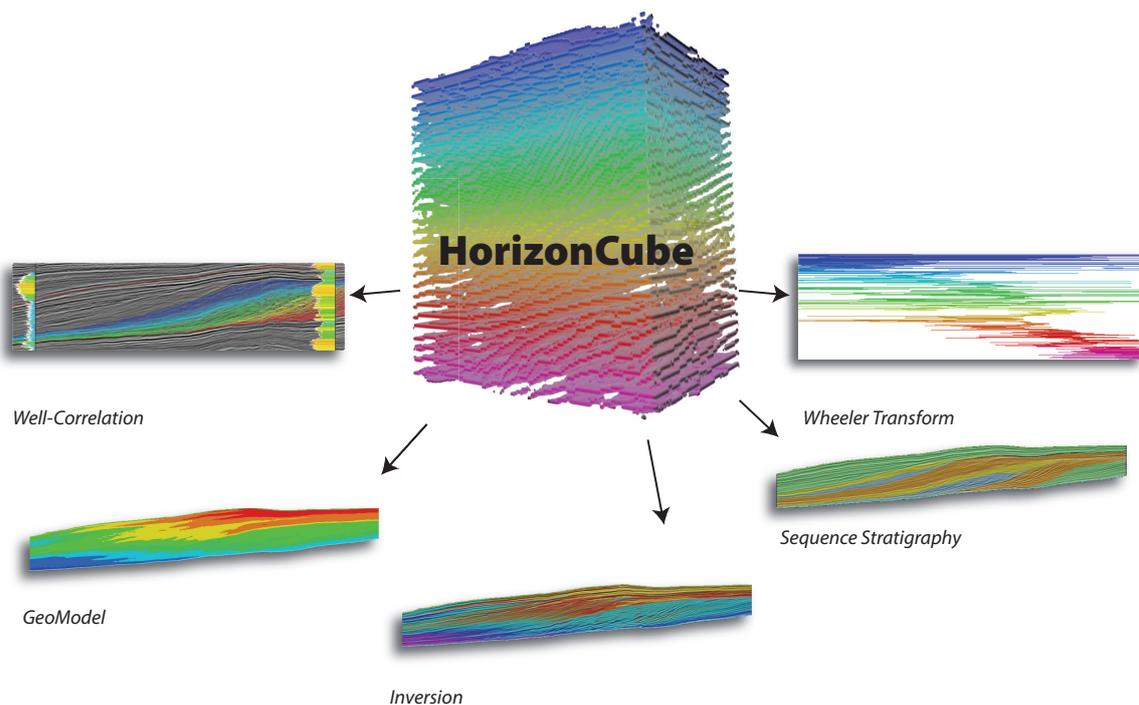
dGB Earth Sciences is meeting this challenge head-on through its innovative HorizonCube Plugin that dramatically increases the number and density of tracked horizons.

And, of course, the ultimate goal – the extraction of maximum information from your seismic data.

The HorizonCube will impact the entire seismic interpretation workflow, leading to significant improvements, including:

The HorizonCube is a step-change improvement in interpretation which is achieved by greatly increasing the number of mapped horizons through semi-automated techniques, thus maximising the potential of high resolution seismic in reservoir characterisation, risk reduction and improved commercial success.

- More accurate & robust geological models
- Superior quantitative rock property predictions
- Easy detection of stratigraphic traps (sequence stratigraphy)

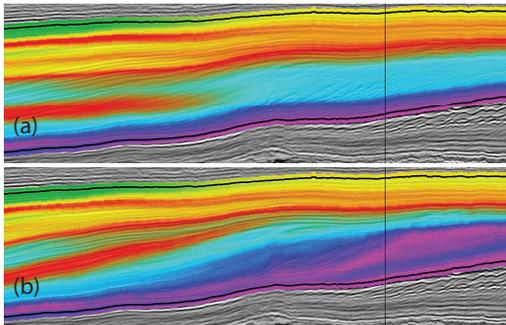


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The HorizonCube plugin was first launched as the Chronostratigraphy that was part of the OpendTect SSIS (Sequence Stratigraphic Interpretation System) plugin. It consists of a dense set of correlated 3D stratigraphic surfaces that are assigned a relative geological age, with a corresponding colour. It wasn't long before we realised the potential of the chronostratigraphy and that the number of applications derived from HorizonCube exceeded just the sequence stratigraphy domain and had applications across the interpretation workflow. The stand-alone HorizonCube plugin was born with the chronostratigraphy separated from SSIS. Today, users can look forward to the following benefits:

- **Low Frequency Model Building & More Accurate, Robust Geological Models**

In standard inversion workflows, the low-frequency model is considered the weakest link. Now, users can create highly accurate low frequency models by utilising all the horizons of the HorizonCube, allowing a detailed initial model to be built.



When comparing a low frequency model created with traditional methods (a) to one created by using the HorizonCube (b) the difference becomes apparent. Note that the HorizonCube model is geological correct, while the traditional model is not at all.

In a similar fashion rock properties can be modelled. Instead of using only a few horizons all horizons of the HorizonCube are used, resulting in greatly improved rock property models.

The HorizonCube & other Plugins

- **Rock Property Predictions**

The highly accurate low frequency models can be used to create geologically correct Acoustic Impedance (AI) and Elastic Impedance (EI) cubes using the Deterministic and Stochastic Inversion plugins. To complete the workflow, the Neural Networks plugin is used to

predict rock properties from the Impedance volumes, avoiding the use of oversimplified linear models which can not accurately describe most rock property relations.

These advanced tools bring a high degree of precision to traditional seismic workflows, resulting in better seismic predictions and more accurate input into the reservoir management decision-making process.

- **Sequence Stratigraphy (SSIS plugin)**

The SSIS plugin works on top of the HorizonCube plugin. Users can interactively reconstruct the depositional history in geological time using the HorizonCube slider, flatten seismic data in the Wheeler domain, and make full system tracts interpretations with automatic stratigraphic surface identification and base-level reconstruction. The SSIS plugin can be integrated with the Well Correlation Panel, enabling the HorizonCube Slider and systems tracts interpretation to be integrated with the well correlation display and its interactive functionalities.

The OpendTect Geology Sequence Stratigraphy Package includes:

Dip Steering, HorizonCube, SSIS, Well Correlation Panel, Seismic Spectral Blueing, Neural Networks, CLAS Lite, PDF-3D, Workstation Access

The OpendTect Geophysics Inversion & Rock Properties Package includes:

Dip Steering, HorizonCube, Deterministic Inversion, Stochastic Inversion, Seismic Coloured Inversion, Seismic Spectral Blueing, Seismic Net Pay, SynthRock, Neural Networks, CLAS Lite, PDF-3D, Workstation Access



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