

## Seismic Sequence Stratigraphy and Sedimentology

*Providing integrated and comprehensive study of stratigraphy and depositional facies as interpreted from seismic data, outcrops, core and well logs to generate model driven prediction scenarios for petroleum and mining exploration*

### Workflow of Sequence Stratigraphic Analysis

1. Tectonic setting study
2. Reconstruction of the paleo-depositional environments
3. Sequence stratigraphic framework

OpendTect SSIS plug-in is used to develop sequence stratigraphy model

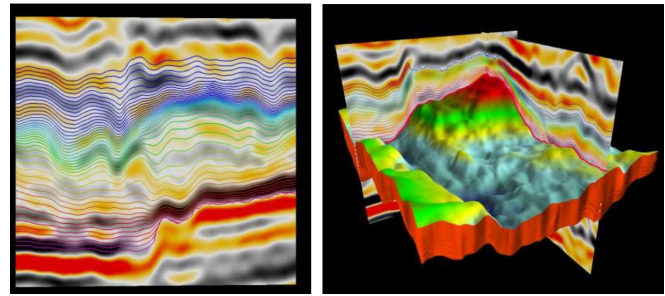
### Horizon Cube

SSIS plug-in enables sequence sequence stratigraphic interpretation of HorizonCubes. This is a set of densely sampled 2D or 3D horizons that follow seismic events. Each chrono-stratigraphic horizon is a geologic time line.

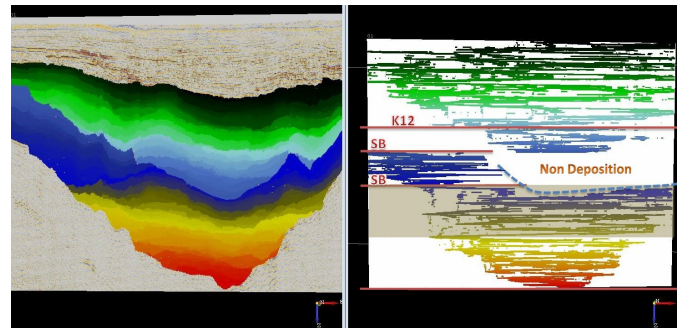
**Creating a steering cube** The dip of seismic events is calculated, optimized as input for the Horizon Cube algorithm that is used to conduct the Sequence Stratigraphic Analysis.

**Fault Interpretation** Fault interpretation is very crucial before applying sequence stratigraphic analysis as the algorithm will deal with independent compartments. Any fault with a dip-slip of more than ¼ seismic wavelength need to be interpreted. The initial horizon interpretation will be defined by the seismic sequence stratigraphic analysis. Faults will be interpreted based on Similarity, Volume Curvature and Fault Cube and Thinned Fault Likelihood (TFL) volumetric attributes. Creating chrono-stratigraphy and system tract information Dense set of chrono-stratigraphic horizons is auto-

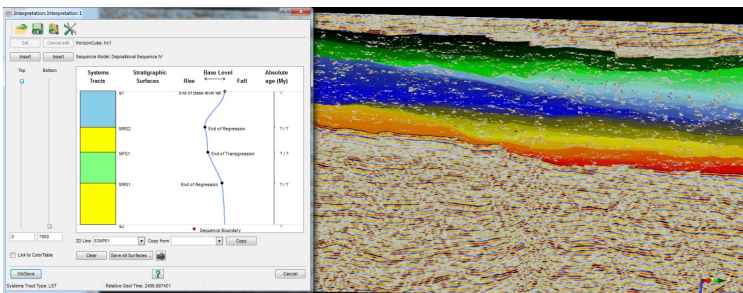
The trends visible in the chrono-stratigraphy will be used to make a sequence stratigraphic interpretation. A sample sequence stratigraphic interpretation without the application of dip-steered median filter showing the quality of data and the variations in stratigraphic fill. The stratal terminations define the sea level changes.



Example of sequence stratigraphy applied for 3D Seismic data, incised valley Fort McMurray (Statoil permission)



Example of sequence stratigraphy (left) and Wheeler diagram (right) applied for 3D seismic data in the Rift Valley basin, East Africa.



tracted on 3D seismic lines. Providing proper pre-processing this set will closely resemble actual chrono-stratigraphy as far as it can be deduced from the seismic data.

### Processing of Chronostratigraphy

If necessary, seismic data is first pre-processed, for example, by applying Structurally Oriented Filtering to create seismic data with low signal-to-noise ratio. Then a steering cube is created, which serves as input to the chrono-stratigraphic calculation. Within a steering cube, every sample position contains dip and azimuth attributes of that particular seismic trace. For chronostratigraphy, dip steering allows tracking along seismic events.

