InsightEarth

PaleoSpark

Remove the structure and see what's inside

CGG GeoSoftware

PaleoSpark
Remove the structure and see

PaleoSpark's patented technology delivers the most desired outcome in stratigraphic interpretation – a volumetric representation of the paleo-depositional environment. This revolutionary solution removes the effects of the selected structure to smooth the way to a complete interpretation. See channels and other stratigraphic features as they were originally deposited. Since this is not a 3D Wheeler Transformation, the interpreter defines the structure to be removed, leaving the prograding fans in place if that is the desired target.

Industry challenge

Traditional interpretation systems image the environment by flattening the volume around a single interpreted horizon. Any reliability disappears as distance from the interpreted horizon increases. 3D Wheeler volumes and proportionally sliced volumes may exist in other software, but none remove structure from the volume like **PaleoSpark** does.

PaleoSpark removes specified 3D structural effects from a volume, so that every horizontal slice output is a paleo-depositional surface. This geomorphological volume reveals previously obscured depositional systems.

### Geobody capture and inverse transformation

Our patented Domain Transformation™ generates a volume of stratal slices optimal for a correct and comprehensive interpretation of geological information related to facies changes, depositional systems and intra-formation heterogeneities. The transformed domain is called stratal domain. Domain Transformation uses horizons, fault planes and the displacement across faults for each horizon to reconstruct the original depositional surfaces. For quality control, any inaccuracies in the interpreted events used as input to the process will be readily visible as irregularities in the stratal slices. Errors can be corrected in the stratal domain or in the conventional structural domain.

Surface wrapping and surface draping transform

Two powerful tools significantly reduce interpretation time. Surface Wrapping rapidly captures the geobodies contained in the entire volume within precise closed surfaces. Surface Draping allows you to quickly define the surface of a laterally-extensive object with great accuracy. Results can be inverse transformed back to the structural domain for further prospect analysis.
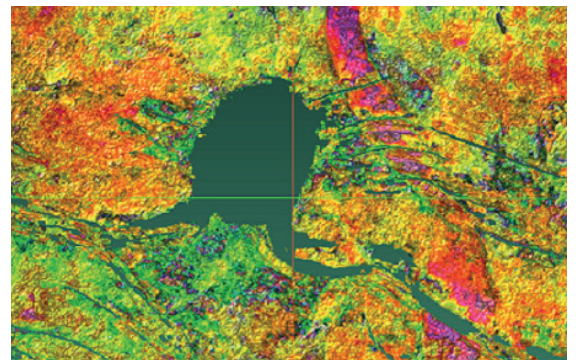
Stratal domain transformation

Each stratal slice is actually a constant geological time slice. As such, it can be made into a horizon with a single click, and transformed back to the structural domain.
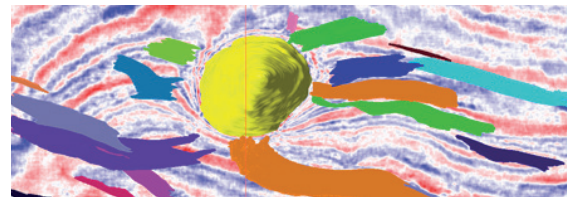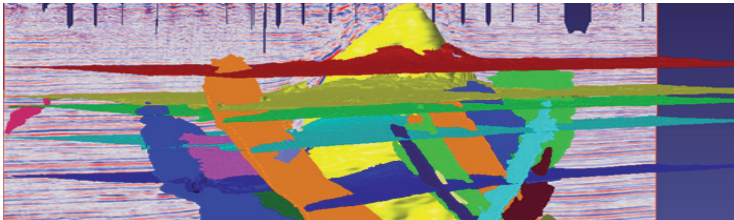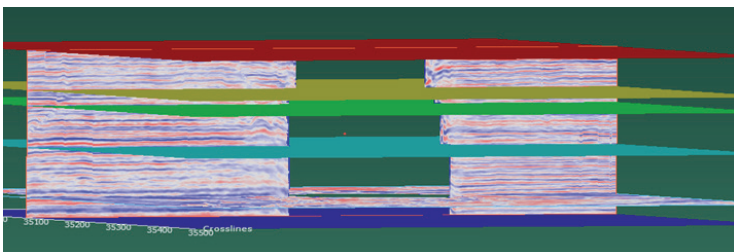

Structural domain.
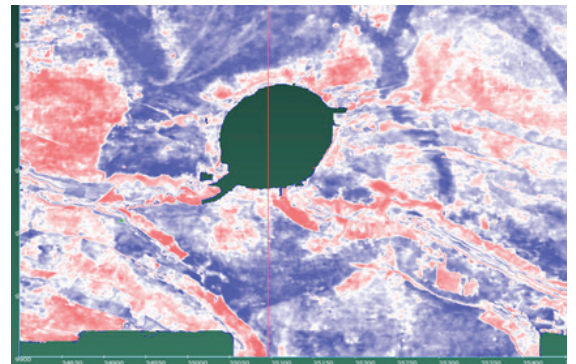
Stratal domain.

This illustrates a stratal slice showing Seismic Facies Analysis by co-rendering the following attributes in different color spectra and lighting:
– Amplitude (red)
– Instantaneous Frequency (green)
– Instantaneous Phase (blue)
– Edge Stack (lighting)

what's inside

Stratigraphy and depositional systems are imaged as patterns that are easily obscured by structural effects.

The stratal domain removes the structure. Now the stratigraphy and depositional systems can be clearly seen and easily interpreted.

Enhanced stratigraphic interpretation in the stratal domain

The stratal slices offer an undistorted view of all the stratigraphic features throughout the data volume, making them much easier to identify and delineate. While traditional horizon flattening would yield a similar image at the actual horizon level (although fault gaps would not be closed as is the case in domain transformation), it would become increasingly inaccurate as one moves away from the reference horizon.

Geoscientists typically use as input to the transformation several horizons, the major unconformity events and all the faults (generated using AFE™). Intermediate horizons can then be picked with greater accuracy in the stratal domain, and transformed back to the structural domain.

Geobody wrapping tools available in the stratal domain are put to good use to capture the volume of a channel, reef or other three-dimensional geological features. These volumes can also be inverse-transformed back to the structural domain.

Attribute calculations in the stratal domain

Three-dimensional attributes have much more detail and fewer disruptions when computed in the stratal domain, free from folding, faulting and other influences that typically distort results. These attributes can be inverse-transformed to the structural domain.

The **PaleoSpark** advantage

- Geoscientists can now visualize, interpret and analyze seismic data in its paleo-depositional setting, unaffected by structural deformation and faulting

- **PaleoSpark** handles differential sedimentation, differential compaction, unconformities, salt bodies, canyons, carbonate platforms, and can remove 3D fault displacements

- Surface Wrapping captures depositional system boundaries, which are then inverse-transformed and merged with the structural interpretation

- Highly accurate mapping of the sweet spots in shale formations helps guide efficient drilling in unconventional plays

PaleoSpark in action

- Instead of months required by traditional interpretation approaches, only minutes are needed for **PaleoSpark** to produce a clear and accurate picture of the exploitable volume. Clearly see the stratigraphy, and meet tough drilling deadlines

- **PaleoSpark** is part of the **InsightEarth**® suite of unique technology from CGG GeoSoftware that includes **FaultFractureSpark**, **SaltSpark**, and **WellPath**. With **PaleoSpark**, hydrocarbon deposits now have nowhere to hide

CGG GeoSoftware

CGG GeoSoftware provides the industry's preferred comprehensive set of software products and support for E&P multi-disciplinary teamwork. High-end, cross-product workflows enable a better understanding of reservoir properties and how they evolve through the life of the field. GeoSoftware helps reduce reservoir risk and uncertainty in seismic reservoir characterization, velocity modeling, advanced interpretation, petrophysics, rock physics, AVO and geological modeling. The GeoSoftware portfolio includes **HampsonRussell**, **Jason**, **InsightEarth**, **PowerLog**, **EarthModel FT** and **VelPro.**

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