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Christian Höcker[1] (1) Shell International E&P, 2280 AB Rijswijk, Netherlands

Depth Conversion for Stacked Reservoirs in Tertiary Clastics

Depth conversion with force-fitting to well markers is the step in subsurface modeling, during which many seismic interpretation results are corrupted. Considerable effort may get invested into models with obvious complexity such as involving salt and carbonate intervals. However, depth conversion of seismic horizons in Tertiary clastics is usually addressed in a rather simplistic fashion. Functions relating 2-way traveltime to depth are used and deviation from well depths are corrected by applying residual grids. Black-box processes may be applied to trim seismic velocities to well velocities and use them to depth-convert seismic and interpretation results. Layer-cake approaches are often difficult to control.

The possible artifacts are demonstrated on a number of case examples. In sketching the technical and business environment it is shown that the need for more accurate and consistent depth conversion approaches has been aggravated by changes in field development technology. Horizontal wells may be very sensitive to depth errors, in particular when drilled along strike. 3D framework modeling of horizons and faults requires 3D consistent depth conversion approaches.

As a remedy, the old and often despised technique of depth conversion by simple velocity functions (V0k) can be refashioned into an effective and fast approach. Vertical compaction trends and lateral velocity variations can be accurately represented, integrating information from seismic processing and direct hydrocarbon indicators in a 3D-consistent way. As such this techniques addresses all needs of depth converting seismic interpretation in Tertiary clastics, in particular for the stacked-reservoir case.