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Simulated migrated seismics for enhanced seismic modeling and geological interpretation of the Cook formation, Oseberg Field, offshore Norway

This poster presents a case study of the use of simulated migrated seismics as a tool to interpret small-scale geological structures. The Cook Formation in the Oseberg field, offshore Norway, is the focus for this new technique. The real 3D pre-stack time migrated seismic data show very specific features which can be interpreted in several ways. Our method consists of an integrated method of forward seismic modeling (simulated migrated seismics) of advanced geological models. The new forward modeling technique uses a resolution function to create simulated migrated seismics. The new method also quantifies the horizontal resolution in addition to the vertical resolution, compared to the commonly used 1D convolution method.

The depositional setting, genetic types and large scale geometry of the Cook Formation were derived by analysis of the available cores, wire-line logs and seismic lines. The Cook Formation is an estuarine infill with a strong tidal and fluvial influence, the envelope of the entire sequence is an elongate ellipsoid. Using the envelopes of regionally correlated sequences as a framework, a more detailed quantitative facies model of the sedimentary architecture was built with sedimentological data of the Gironde tidal estuary (SE France) as an analogue. Relevant wire-line derived impedance values were assigned to the facies models. These models were used as input to create idealized 2D simulated migrated zero-offset seismic sections. Comparison with the real seismic section shows promising results that warrant further evaluation and the re-interpretation of the geological data set resulting in new insights for geological interpretation.