

Providing structurally valid inputs for geomodelling. Examples from the Dønna Terrace.

Modern interpretation software and machine learning technology can make it simple to supply cosmetically “good” seismic interpretations for geomodelling. Autotracked horizons and fault probability workflows, for example, can interrogate 3D seismic data in a way not possible by manual interpretation. The wealth of attributes that these processes extract can significantly improve reservoir characterisation. Whilst the detail and apparent completeness of the interpretations, whether derived manually or automatically, can suggest they are valid, unless they can pass a series of basic validation steps they cannot be considered admissible, never mind fit for purpose.

The main structural validation steps include 1) having a clear conceptual model consistent with regional and local tectonic setting; 2) limiting sudden variations in stratigraphic thickness or fault throw; 3) interpreting faults and horizons together, delivering a water-tight, structurally consistent interpretation; 4) that fault intersections and their associated branch lines are interrogated and honoured; and 5) faults are named in a field-appropriate manner and ascribe a confidence based on interpretational uncertainty.

These steps should be carried out by the interpreter and all changes should refer to the primary seismic data. If invalid interpretations are provided, the geomodeller will be forced to make adjustments to complete the model which are not necessarily based on data or the structural concept developed by the interpreter.

Here, we suggest that seismic interpreters validate their interpretations and deliver surfaces using a structural framework modelling workflows, which are included in all major seismic interpretation software. If done correctly, this significantly reduces the time between the delivery of an interpretation and the completion of the geomodel (days to weeks, rather than months). We demonstrate the workflow and benefits from Aker BP fields and development projects located on the Dønna Terrace, in the Norwegian Sea.