

Integration Of Borehole Image Log And Surface Seismic Data For Improved Characterisation Of Complex Fault Zones

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Since the 1980s borehole image logging has provided geoscientists with an excellent means to visualise the subsurface. Micro-electrical and later also acoustic and nuclear measurement principles have been used to build tools that can provide high-resolution image logs over long rock sequences. The possibility to detect, orient and classify different sedimentary and tectonic features in borehole image logs has played an important role in improving our capability to build reliable geological models and in unraveling complex reservoir structures.

In many parts of the world hydrocarbon exploration is shifting towards more difficult reservoirs. Several exploration companies in Europe have moved their attention towards relatively small, complex structures in the vicinity of major tectonic structures, such as thrust faults in the Alps and Pyrenees.

Structural interpretation in general can benefit greatly from a combination of seismic sections with borehole image logs. Bedding dips can be displayed in the form of apparent dip sticks along the well trajectory to check structural dip interpreted from surface and/or borehole seismics. Besides apparent dip sticks we use powerful software to generate structural models from bedding dips and interpreted faults and fractures, although we need to make certain assumptions about the dominant structural style.

Accurate descriptions of fracture and fault systems on borehole images has helped to better understand the delicate interplay between eustatic sea level changes, sedimentation and tectonics.

This paper, which describes examples from a/o the Alpine thrust fault systems with associated drag folding, demonstrates how borehole imaging can play an important role in better understanding of complex reservoir structures.