Fault characterisation by integration of core CT scans and borehole image logs

Attila Petrik[1], Carsten Vahle[1], Andras Uhrin[1]

[1]Eriksfiord AS, 4021, iPark, Stavanger (Norway)

High-resolution wireline and LWD borehole image logs (BHI) provide an exceptional insight to finer-scale structures of fault zones on the scale between seismic and core data. BHIs are capable of quantitatively characterizing geometrical (e.g. orientation, aperture, intensity) and spatial properties (e.g. connectivity) of fault zones and related subsidiary structures. Furthermore, the integration with core CT scans enables the re-orientation of core features, which support the evaluation of fault kinematics and stress field. The relative sequence of deformation is determined by backstripping of structural dip, analysis of structural axes, angular unconformities, or the use of overprinting criteria. Syn-kinematic growth strata, a gradual change of structural dip, or bounded faults could specify the time of fault activity. Fault apertures or infillings can be characterised by the integration of BHIs and core. We demonstrate through several examples the advantages to the understanding of structural features (e.g. deformation bands, fault drag) in fault zones, and in particular the integration of BHI with core (Fig. 1). The quantitative and qualitative characteristics of these sub-seismic structures provide important input to discrete fracture modelling, structural/reservoir models, and to fault evolution and fault zone sizes at multiple scales.

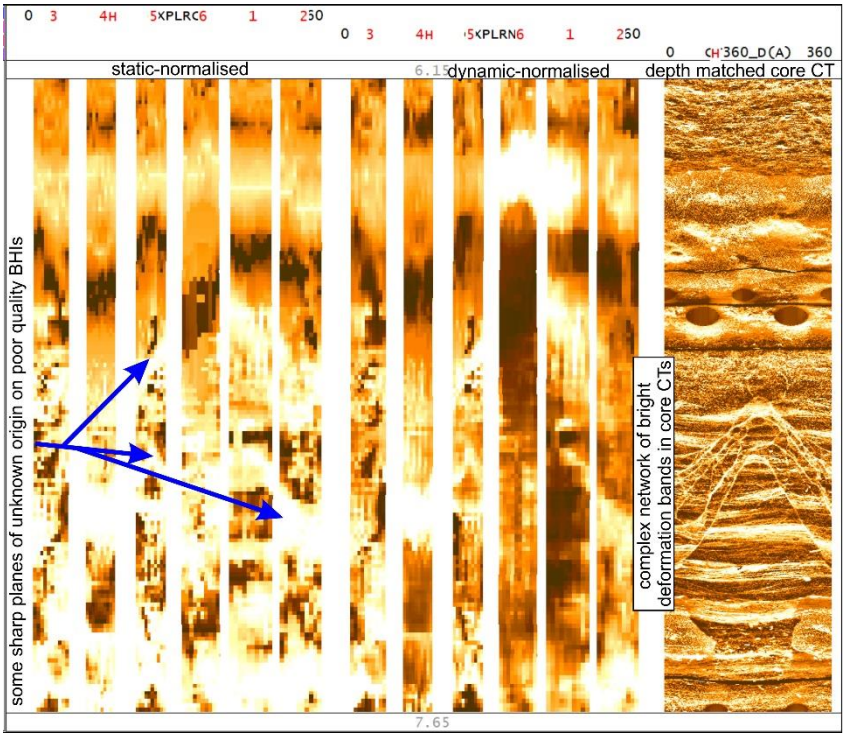

Fig. 1.: Planes of unknown origin in poor quality BHIs revealed as a network of deformation bands in corresponding core CT scans.