



Tectonic regime and deformation bands properties in porous sandstone

Roger Soliva (1), Gregory Ballas (2), Haakon Fossen (), and Sven Philit (1)

(1) University of Montpellier France (soliva@gm.univ-montp2.fr), (2) IFREMER, Plouzané, France (gregory.ballas@yahoo.fr), (3) University of Bergen, Bergen, Norway (haakon.fossen@geo.uib.no)

Porous sandstones tend to deform by the formation of low-permeable deformation bands that influence fluid flow in reservoir settings. The bands may be distributed or localized into clusters, and limited recent data suggest that tectonic regime may exert a control on their distribution and clustering. In order to explore this suggestion, we performed a synthetic analysis based of 73 sets of bands, including 22 new sets measured for reverse Andersonian regime that significantly fill the important gap of data for this context. We find a surprisingly strong correlation between clustering and tectonic regime, where bands clearly are more distributed in the reverse regime compared to the normal regime. Together with the observed band distributions, microstructures and capillary pressure data show evidence that efficient membrane seals are promoted for extension, whereas pervasive permeability anisotropy is expected for contraction. Such a basic new rule concerning tectonic regime is very useful for assessment of reservoirs properties where deformation bands are common but below seismic resolution.