eas characterized by E-W to WNW-ESE structural trends show declinations rotated clockwise. Declinations show a correlation with the structural trend for both HT and LT components, but in the case of the LT component the magnitude of the declinations deviation is smaller. Results from the sandstones confirm the presented outcomes and additionally prove the heterochronic age of the deformations that differ between the marginal and the internal zone of the fold–and–thrust belt.

The presented declination data support only local oroclinal bending which give rise to the strike deviations in the thrust-belt. In the Ardennes clockwise rotations of the thrust occurred only within narrow transpressive zones, active during the propagation of the thrusts. It is also suggested that the long segment of WNW-ESE trending thrust-belt, that includes the Massive Artois, represents the oblique transfer zone between the Ardenno-Rhenish and SW England frontal belts.

Mechanics of Large-Scale Sand Injection – Understanding the Hamsun Giant Sand Injectite Complex

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Sandstone intrusions (injectites) are intriguing features as, despite their widespread occurrence, their origin is poorly constrained. The lack of process understanding poses a challenge to anyone dealing with post-depositional sediment remobilization. The formation of large-scale sand injectites has been attributed to various factors and processes such as: overpressure build-up, fracture propagation, fluidization, etc. Overpressure build-up can be caused by a variety of mechanisms such as disequilibrium compaction, loading by mass transport deposits, earthquakes, bolide impacts, or injection of fluids external to the sand body, such as, for example, hydrocarbons. Fractures start to propagate when pore-fluid pressure in a sand body exceeds the vertical or horizontal stress and the tensile strength of the host rock. Pressure-differential forces sediments to flow and fill fractures in the host rock. Depending on pressure conditions in the source bed and the seal and on the rheological properties of the host rock, sand injectites may form a range of geometries.

Clastic injectites occurring in the form of sills or dykes have been described for many decades. The size of clastic intrusions varies on a scale from sub centimetre to hundreds of metres. Recently, they have been recognized not only in outcrops but also on seismic data. A spectacular example is the Hamsun giant sand injectite complex that is located in the Paleogene of the North Sea. This complex is believed to be world's first sand injectite that was deliberately (and successfully) drilled by Marathon Oil UK as a hydrocarbon prospect, adding several tens of millions of barrels of oil to their Alvheim development. The Hamsun complex is sourced from the Hermod sand which occurs in Sele Formation and is believed to be of early Eocene age. The injectite complex was investigated by means of multi-volume-based 3D seismic interpretation and visualization in order to gain detailed characterization of the complex body. Overall shape of the body was analyzed, including its thicknesses, angles, depths, heights and relation to faults. Borehole core from two locations along the injectite were examined and constitute the ground truthing of the 'remote sensing' 3D seismic datasets. The investigations enabled drawing some conclusions about the Hamsun complex, like for example multi – phase injection.

Sand injectites are currently the subject of a concerted research effort at the University of Aberdeen, drawing on data from key outcrop analogues and selected sand injectite oil fields to catalogue the range of injectite styles, grain size variations, geometries and sizes, in order to establish genetic models and assist in reservoir modelling of sand injectite oil fields.

Record of Motion Along the Red River Fault Zone in Provenence Studies, Northern Vietnam

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Provenance studies and, clast analysis in particular, are a valuable source of information on timing of uplift and denudation in source area. These studies may also document motion of a source area for basins related to strike-slip faulting. In this paper we present first results of clasts analysis from sedimentary basins adjoining the Red River Fault Zone (RRFZ) in Northern Vietnam.