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Deep-Water Sedimentation on an Evolving Fault-Block: Insights from the Annot Sandstones

Interaction of turbidity currents with topography is known from previous work to have an effect on flow dynamics and directions, and also a direct bearing on sedimentation from these flows. With enhanced topography, such as generated by a fault scarp and hanging-wall low, the effects of flow confinement become increasingly important relative to flow deflection.

One of the few examples of half-graben formation within the confined basins of the Grès d'Annot (SE France) is preserved in the basal fill of the Annot sub-basin. Around the towns of Braux and St. Benoit, outcrops are separated by a fault with 400 m normal throw to the east. Detailed mapping of the Grès d'Annot and the underlying formations indicate a three-phase syn-tectonic sedimentary evolution for the outcrops, from initiation to cessation of movement on the fault.

The effects of the faulting on turbidite deposition are clearly demonstrated. Initial sandstone accumulation was fully confined in the hanging-wall low, depositing tabular bedded sand- to mud-grade sediment. As this hanging-wall accommodation space filled, the relative height of the bounding footwall high decreased. On encountering this reduced topography, the fine portion of the turbidity currents surmounted the topography, becoming flow-stripped from the confined bulk of the flow. This led to two juxtaposed sedimentary sequences: (1) thickly bedded, amalgamated coarse sandstones in the hanging-wall low, having a high net:gross, and (2) thinly bedded fine sandstones and mudstones infilling and draping the shallow topographic lows on the footwall high. The ability to predict this generation of enhanced net:gross by flow-stripping within turbidite reservoirs is of importance to deep-water exploration strategies.