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Depositional Response to Structurally-Generated Topography in Deep Water Thrust Belts: Comparison of the Grès d'Annot Basin (Southeast France) with Modern Deepwater Fold and Thrust Belts

Thin-skinned thrust ramp anticlines that grow during deposition in a deepwater setting should produce a predictable stratal response. An area of seafloor is uplifted over the footwall ramp, on to which the deepwater sediments thin or pinch out. As the thrust sheet moves forwards, the positions of sediment thinning or pinchout migrate backwards across the thrust sheet, producing a characteristic onlap/offlap pattern. Seismic data from ramp anticlines in the Niger Delta toethrust system show stratal patterns which closely match the geometries predicted by forward modelling.

The Grès d'Annot Formation of SE France is a well-exposed turbidite system that was deposited in the Eocene-Oligocene Alpine foreland basin. The basin floor experienced active thin-skinned folding and thrusting during deposition of the turbidite sequence. Therefore the turbidite sequence should display some of the features predicted from structural modelling and observed in analog seismic data sets. This presentation will show some features that we believe are related to syndepositional thrusting. For example, the base and top of the turbidite sequence commonly consists of a distinct thin-bedded silty facies that probably represents onlap and offlap against a tilted substrate, which may in places be related in part to movement of the basin floor over deeper thrust ramps. Some major channel incisions may be a response to local uplift over thrust-related uplifts.

Sediment supply variations, eustacy and other extrinsic factors also influence the stratal geometries within the basin, but the role of syndepositional thrusting within the basin may have been previously underestimated.