



Using high-resolution bathymetry to identify basin inversion structures on the English Channel shelf

J Collier (1), S Gupta (1), G Potter (2), and A Palmer-Felgate (1)

(1) Dept. Earth Science & Engineering, Imperial College, Prince Consort Road, London, (2) UK Hydrographic Office, Admiralty Way, Taunton, Somerset

High-resolution bathymetry is used to derive a new structural interpretation of a submerged inverted graben on the English Channel shelf (north-west Europe). The data were originally collected for maritime safety reasons rather than for academic study. Despite its continental shelf location, the bathymetry provides an unexpectedly clear and continuous plan-view image of the bedrock geology. The bathymetry resolves fine structural detail and is particularly useful for structural interpretation in areas of steeply-dipping strata where traditional seismic reflection imaging fails. The imagery, combined with shallow core, deep borehole and 2D seismic reflection data, shows a marked asymmetry in the bedrock outcrop and structural style, both across and along the axis of the basin. For example, the oldest syn-rift rocks outcrop in a complex south-verging anticline along one margin, whereas more massively bedded younger rocks are folded into a simpler anticline at the other. Comparison of our observations with both recent analogue modelling and a neighbouring inverted basin highlights the importance of the mechanical properties of the basin stratigraphy in controlling the structural development. We infer that the inversional asymmetry developed because of the distribution of strong competence contrasts within the syn-rift fill. We conclude that bathymetry data has been underused in the study of geological structures in shelfal settings.