Seismic evidence for mantle exhumation and serpentinisation in the Porcupine Basin

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New wide-angle seismic data along a 230 km profile that runs across a deep structural feature (Porcupine Arch) within the Porcupine Basin are presented. Sixty-five ocean bottom seismometers were deployed at ~ 3 km intervals and airgun sources fired at 100/150m intervals along it. Results of forward modelling indicate that the continental crust is extremely thin (locally < 2 km) across the basin centre, and in places may be absent. The sedimentary succession is up to 12 km thick and comprises three distinctive seismic layers. The uppermost two layers are interpreted as a postrift succession of Cretaceous and Cenozoic strata deposited following a major phase of Jurassic lithospheric extension. The lower layer is interpreted as a succession of predominantly Jurassic synrift sediments, whose largescale geometry reflects the response to the focussing of extensional strain, produced by a simple shear mode of differential lithospheric extension. A strong asymmetry in crustal geometry is probably related to this mode of extension. Crustal thinning is greater than in the adjacent Rockall Basin. Local exhumation of continental mantle lithosphere may have occurred in parts of the Porcupine Basin, as suggested by very low Pn velocities. This project is funded by the Geological Survey of Ireland and the Irish Petroleum Infrastructure Programme.