

Applications of the BIRPS Deep Seismic Data to Understanding Crustal Processes.

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Deep seismic profiling has evolved from an observational technique into a powerful tool for studying the evolution of the lithosphere. Initially, it was used to establish geometric relationships between near surface and deep crustal structures. In the last decade, there has been a move to acquire profiles with integrated near-normal incidence, wide-angle (V_p and V_s) and potential field datasets, which have enabled us to determine, with greater confidence, physical properties of the lithosphere and reduce the degree of ambiguity inherent in interpretations relying on only near normal incidence data. The future lies in being able to further develop methods for measuring the physical properties of the deep crust at increased resolution if deep profiling is to continue to contribute to understanding lithospheric evolution.

The UK and Irish continental shelves are the parts of the lithosphere most densely sampled by deep reflection profiling. These data are supported by limited wide-angle data and good potential field data. These data are being compiled into an integrated dataset which allows details of lateral variations in crustal structure to be recovered. Initial observations demonstrate that the crust in this region is distinct in character, but different from large areas of the continental lithosphere, in that it is c. 10 km thinner than the average over the Earth. With a full understanding of the properties and tectonic evolution of this lithosphere it is possible to exploit this difference to provide a better understanding of the physical processes controlling lithospheric evolution.