The BGS's expertise in offshore geology is being extended through international partnerships. **Robert Gatliff** and **Derek Ritchie** describe one of these, a joint study by the BGS and the Faroese Geological Survey with co-funding from the oil industry.

Exploring the Western Frontier

In 1993 the BGS published the offshore regional guide to the area West of Shetlands. Like all our other regional reports the focus was very much on the UK sector. The volume was the first detailed summary of the geology and provided an extremely valuable insight into the challenges of exploring and developing resources in this frontier area. At the time there had been several hydrocarbon discoveries in the UK sector, including the giant Clair oil accumulation on the Rona Ridge, but no production.

At around the same time as the regional guide was published a new phase of exploration took off, following the announcement of the new Foinaven and Schiehallion oil discoveries by BP in deeper water to the south-west of the Clair Field. The BGS responded to the renewed enthusiasm by undertaking a series of new research projects, including a suite of litho- and sequence-stratigraphical atlases. Many of these projects were supported by consortia of oil companies keen to expand their knowledge of the frontier areas to the west of Britain.

The BGS Rockall Consortium Project provided the means to undertake the first shallow drilling to test the stratigraphy in the Rockall Basin and surrounding areas. As part of the project a series of cored boreholes were drilled in the southern part of the Faroe–Shetland Basin to define the age of unconformities that reach close to the seabed over Cainozoic inversion structures. The Rockall Project is still very active and is now funding the first offshore report on the Rockall area. In addition, we are working closely with the Irish Petroleum Affairs Department to study the Hatton Basin and margins to the west of Rockall.

The Western Frontiers Association has focused on geohazards associated with exploration and development in the difficult conditions in the deep waters of the Faroe–Shetland Basin. The BGS has now developed the concept of the 'shallow geological model'. Key topics for research are the controls on the timing and distribution of submarine landslides, the distribution of seabed features and difficulties associated with drilling through thick volcanics.

The Passive Margin Modelling Project developed techniques for integrating evidence from deep seismic profiling and potential field data to model sub-volcanic

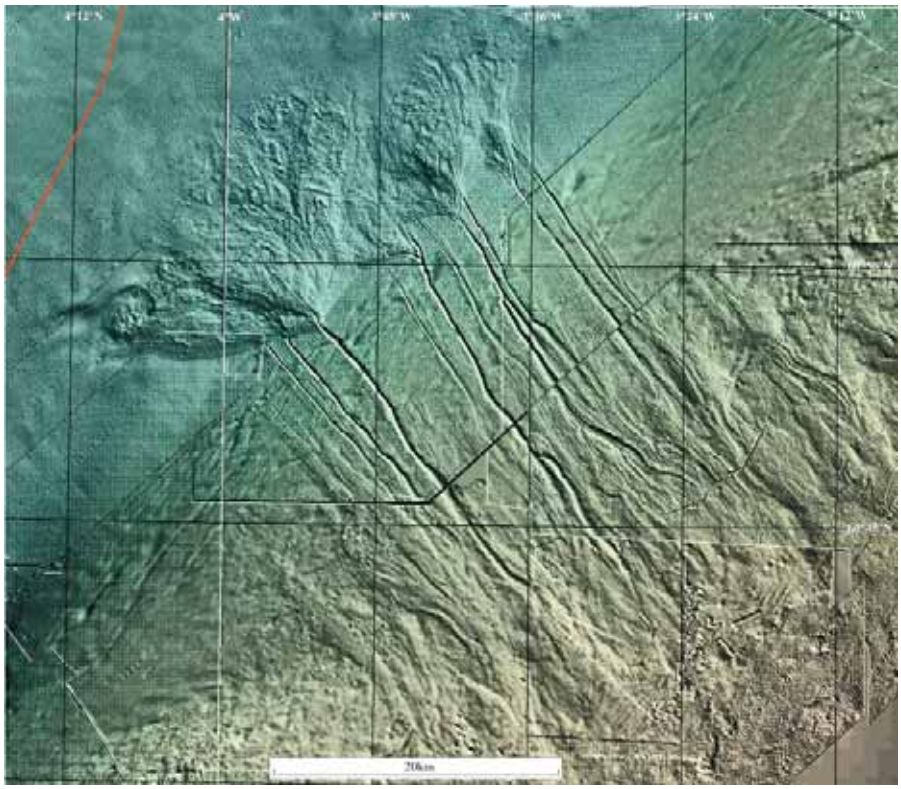

Image of seabed sedimentatary features from 3D seismic provided by Western Frontiers Association Members.

basin structure in areas of poor seismic imaging.

The EU-funded Stratagem project has provided a focus for studying the stratigraphy of the Neogene across the entire north-east Atlantic margin. In this area the interplay between tectonics, deep sea currents, and the impacts of climate change associated with the onset of glaciation have played a crucial part in the development of the margin.

We proposed to the oil industry that the results of our research and oil company exploration should be integrated into a new offshore report for the Faroe–Shetland Basin. Support for the idea has been widespread, but with one proviso: the report should look at the entire basin and not just the UK sector. We were delighted to explore the potential for a joint project with the Faroese Geological Survey and were even more delighted when an agreement was reached to undertake the collaboration. The area of study was soon agreed, and the project is now under way. Both surveys are receiving excellent support from nearly all the operators and partners in the entire Faroe–Shetland Basin area.

The contents of the report will include detailed tectonostratigraphical analysis, geohazards, environmental issues, resource assessment and a section on developing technologies for sub-volcanic seismic imaging. We plan to release the results of the project in 2007. They will include both a published report and electronic products including a geographical information system and definitive structural nomenclature of the entire region.

The model of working internationally with our neighbours opens up opportunities to make real progress in understanding the geology and resource potential of an entire basin. The model forms the basis for similar proposals to study the Southern Permian Basin (extending east through the Netherlands, Germany, and into Poland), and the St George's Channel where close links are being forged with the Irish authorities.

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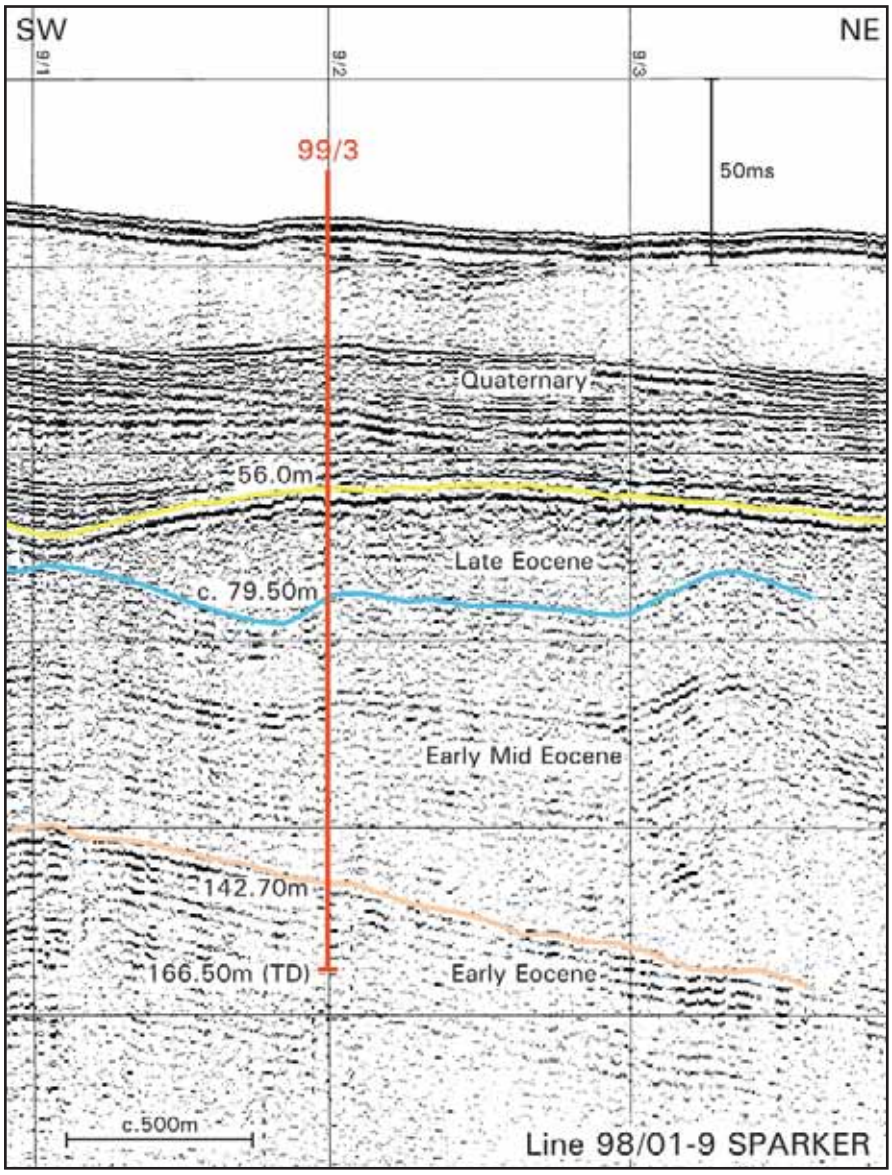
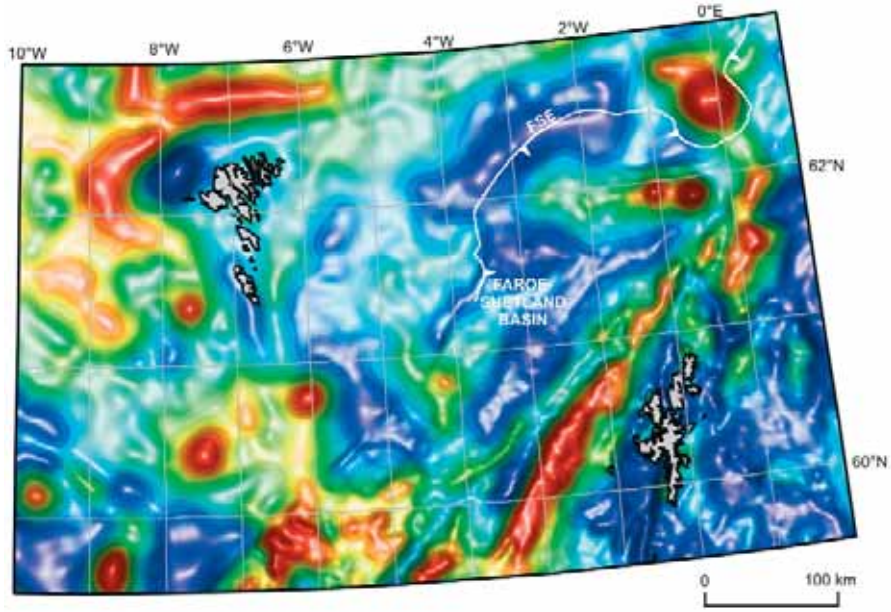


Cainozoic inversion structures picked out in a seismic section.



Isostatic gravity anomalies over the Faroe–Shetland region.