

The Western Frontiers Association

Geohazards in a frontier area

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A joint industry group was established in 1995 by the BGS to investigate sea bed conditions and evaluate geohazards west of the UK. The group, known as the Western Frontiers Association (WFA), comprises 14 oil companies and the Health and Safety Executive (Offshore Safety Division) (HSE). The WFA was formed following a regional study by the BGS, for the HSE, two years earlier. This study demonstrated that ground conditions to the west of Britain, were more varied than in the North Sea and that processes and hazards were less well

understood. The WFA is similar to, and relates with, other joint industry groups covering oceanographic data (North West Approaches Group) and environmental matters (Atlantic Frontiers Environment Network).

The group initially focused on the area west of Shetland following the upsurge of interest after the Foinaven and Schiehallion oilfield discoveries.

Following the 17th round of licensing in 1997, the areas of focus were extended to include the Rockall Trough and the margin north of 61° 40'N. The group has commissioned a wide range of studies to assess geohazards such as shallow gas, slope stability and methane hydrates on a regional basis. Reports have been produced on these topics along with an atlas of hazards. Data acquisition has been undertaken on a regional basis and combined with operators' data and the BGS's previous regional

The AFEN slide, situated some 90 km north-west of Shetland on the Faeroe–Shetland Channel slope at 500 m water depth. The slide is 13 km long and 3 km wide on a slope of one degree. The image has been created using the first (sea bed) acoustic signal return from a conventional 3-D exploration seismic data set.

surveys to complement studies acquired by the commercial site survey industry. Seismic (earthquake) monitoring has been under way for more than three years to aid risk assessments.

The principle focus of the WFA is the examination of geohazards, in particular the type of hazard, its location, size, frequency, activity and how it may affect temporary or fixed structures placed on the seabed. The earlier study for the HSE identified that west of the UK there were geological hazards not encountered in the North Sea. These include iceberg ploughmarks, debris flows and hydrates. More recent studies have also identified the presence of shallow faults, and sea bed mounds that may need to be considered in planning sea bed activities.

Occasionally, small area studies, such as the evaluation of landslides, have been undertaken to examine a hazard in detail, where the results can be extrapolated regionally. The illustration shows a sea bed slide 3 kilometres wide and 13 kilometres in length extending from 800 metres water depth in the south-east to 1200 metres water depth in the north-west. This slide has occurred within the last ten thousand years and is interpreted to have been a multiple event caused by repeated failure of the back scarp causing retrogressive failure upslope.

The results of the studies commissioned by the WFA have applications beyond the site survey sector. A wide range of physical processes have shaped the sea bed west of Shetland, creating environments that may influence benthic biota as well as affecting structures placed on it. Studies of the movement of sediments may assist modelling of cuttings distribution and sea bed morphology studies are improving oceanographic modelling of the Faeroe Shetland Channel. The results of these studies have been presented in the form of reports, maps and databases supported by software developments.

The WFA grouping collaborates with other joint industry programmes looking at sea bed geology and geotechnics on similar margins such as the Seabed Project on the Norwegian margin and similar groups for areas offshore Ireland and the Faeroes.

For further information, visit the WFA web-page at: www.bgs.ac.uk/bgs/w3/pmgg/pmg_wfa1.htm

