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Mud Mound / ?Diapiric Features in the Faroe - Shetland Channel

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Various high resolution and conventional multi-channel exploration seismic profiling (1966-2002) at the northern end of the Faroe - Shetland Channel (FSC) have identified several large sea bed mounds with a possible diapiric form, originally named the Pilot Whale Diapirs. Some mounds rise over 70 m above the surrounding sea bed and are 2 - 3 km across. The profiles show that the sea bed examples are just a tiny fraction of more extensive subsurface features, covering more than 2000 km², with less than 10% disturbing the sea bed. The subsurface features occur principally at two levels with a migration northwestwards from deep to shallow.

The seismic profiles identify the host deposits as part of the thick Neogene to Quaternary sequence infilling much of the FSC. The latter includes the North Sea Fan (up to 1 km thick) comprising extensive debrites and some catastrophically emplaced megaslide debrites, two of which abut the mud mounds. The mounds and related subsurface features display various morphologies and seismic facies, and a range of processes may be involved in their development, including mud volcanism, subsurface injection of soft sediment and diapirism.

The features are developed above the crest and NW-flank of a NNE trending symmetrical anticline that is expressed at the stratigraphic level of top Palaeogene lavas and they appear to be broadly aligned with the axial trace of this structure. This anticline appears to have continued developing at least into the Pliocene. Material comprising the mounds and related subsurface features appears to have been derived from the subsurface evacuation hollows developed within the ?Eocene to Miocene succession. The formation of these features is thought to be associated with tectonic compression, overpressuring of older sediments due to rapid loading or fluid release upon diagenesis or some combination, including movement on NW-SE trending lineaments.

The location of the mounds above a Cenozoic inversion dome and at the margin of a thick sediment wedge (the North Sea Fan) is similar to the setting of large mud mounds observed offshore Norway.