Results of Geophysical Surveys in the Area of the Aegir Ridge, the Iceland Plateau and the Kolbeinsey Ridge

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It is today accepted that after break-up and separation of the European and Greenland blocks, expansion caused by production of oceanic lithosphere at the Mid-Atlantic ridge proceeded, developing the present Norwegian and Greenland Seas. The asymmetrical location of the present active Mid-Atlantic ridge is explained by a westward relocation of the ridge producing oceanic lithosphere through Tertiary time.

In 1969, 1971 and 1972 geophysical investigations of the German Hydrographic Institute and the Bundesanstalt für Bodenforschung (Fig. 1) were carried out by *R. V. Planet*, *Komet* and *Meteor* partly together with the Seismological Institute of Bergen and the Norwegian R.V. *Nordskap*. Some of these results will be presented in this report.

From refraction seismic measurements it can be assumed that the crust within the 200 km wide *Aegir ridge* consists of blocks of oceanic crust as encountered near the Jan Mayen ridge (Hinz & Moe 1971; Hinz 1972) interspersed with ultrabasic sections. If this is true it would mean that the zone of the Aegir ridge represents an important rift zone in addition to the Mid-Atlantic ridge.

The *Iceland plateau* is divided by a north-south trending escarpment into an upper and lower plateau. Within the upper Iceland plateau up to 300 m of sediments overlie the completely flat, presumably basaltic basement. The thickness of the unconsolidated sediments increases to the south. Magnetically the zone west of the escarpment is characterized by anomalies with amplitudes of about 1000 n.T. and more. At 16°W the character of the anomalies changes abruptly. East of the escarpment follows a zone with a flat-lying basement and a thin sedimentary cover. Further to the east the acoustic basement steepens eastwards and suddenly has a considerable relief. The sediments thicken to the east, reaching a thickness of up to 2000 m in the area of the southern part of the Jan Mayen ridge. The area east of 16°W has lower magnetic amplitude anomalies (100 n.T.–400 n.T.). The anomalies show no preferred trend.

Within the investigated part of the Jan Mayen ridge the upper sediments have nearly horizontal layering and seem to fill in an older relief. This stratigraphic relationship points to an important regression and erosion phase

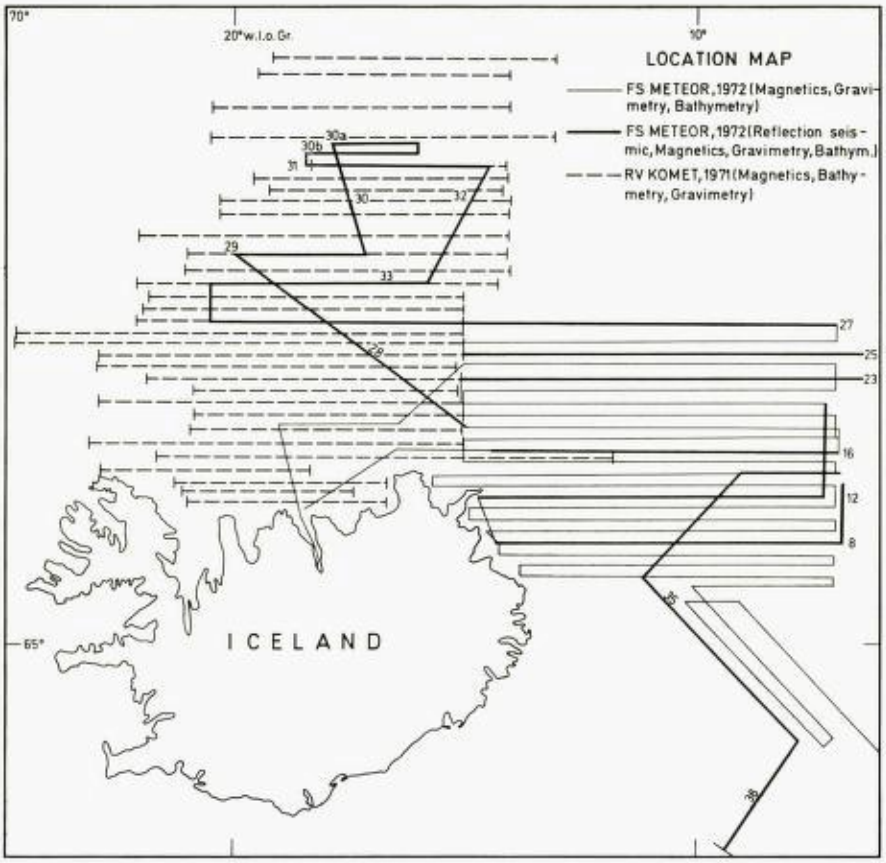

Fig. 1. Location map showing the traverses of the FS. Meteor and RV. Komet.

caused by eustatic changes of sea level and/or rise of the Jan Mayen ridge. The seismic records indicate that after a period of erosion/regression and flow basalt activity the present lower Iceland plateau foundered.

Directly west of the Iceland plateau lies the *Kolbeinsey ridge*. In general, the Kolbeinsey ridge crest is almost devoid of sediments. The sediment thickness generally increases towards the flanks and is thicker on the western flank than on the eastern flank. Sediments more than 200 m thick were found mainly within the area of the Spar fracture zone and locally in the rift valley. The results of the magnetic-gravimetric survey have been published by Meyer et al. (1972).

From the geophysical data it seems that spreading and production of oceanic lithosphere have not occurred only along a single ridge at one particular geologic time. The bifurcation of the Kolbeinsey ridge (Meyer et al. 1972), the refraction seismic results from the Aegir ridge (Hinz & Moe 1971; Hinz 1972), and the thinned crust within the Vøring plateau (Hinz 1972) favour the idea that in the Norwegian Sea spreading and production of oceanic lithosphere sometimes occurred along several tectonic zones.

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