

AN INVESTIGATION OF THE IGNEOUS ROCKS ON HAREØEN AND WESTERN NÛGSSUAQ, WEST GREENLAND

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Hareøen is an island north-west of Disko in western Greenland. It has the form of a plateau, whose highest point – 512 metres – is found near the south coast. Like the neighbouring parts of Nûgssuaq and Disko, Hareøen consists chiefly of Tertiary basaltic lavas. The island first attracted attention on account of the presence of inter-basaltic, coal-bearing sediments on the north-east coast. These were already examined by Giesecke in 1811 (Giesecke, 1910) and later among others by Steenstrup (1874) and B. E. Koch (1959). A petrographic investigation of the basalts was first undertaken by Holmes (1919), who described loose fragments rich in K_2O . Lavas from the south coast, collected and analysed by Pedersen (1970), also have a high content of potash. V. Münther in the years 1948-49 undertook geological mapping of the island, on which the present investigation is supported (Münther, in press).

The lavas in the West Greenland basalt province are divided into a lower olivine-porphyrific formation and an upper, chiefly plagioclase-porphyrific formation (a summary of the geology of the district is found in Rosenkrantz & Pulvertaft, 1969). Both are known from Hareøen; the lower formation is found only on Niaqua in the east, while the upper formation is known from the rest of the island. They are separated by a fault striking NNE.

The lower formation consists mostly of 1-3 m thick layers of dark grey weathering, vesicular pahoehoe lavas. The layers are most often rich in phenocrysts of olivine. A group of 3-5 flows of reddish-brown weathering, tholeiitic, aphyric aa lavas can be followed for about 2 km. The layers dip W at about 30° ; they are cut by normal faults. The upper formation on Hareøen can be divided into an older chiefly plagioclase-porphyrific group and a younger olivine-porphyrific group. It is cut by a number of faults mostly striking NNE. In several cases the vertical displacement is more than 200 m.

The basalts of the former group are tentatively divided into a number of lithological types. On the western part of the island 5-10 m thick basalts characterised by a large content of augite phenocrysts predominate. This unit is separated by faults from the basalts on the central part of the island. Here, in small areas, 5-10 m thick plagioclase-porphyrific basalts alternate with aphyric basalts. More widespread, however, is a unit with 10-20 m thick flows of plagioclase-augite-porphyrific

basalts characterised by large, yellowish brown weathering vesicular and scoriaceous zones. Flows of this type overly on the south-west coast a plagioclase-porphyritic series. The chronological relations between the two types are not known. In two places near Talerua on the north-east coast extrusive layers of acid or intermediate rocks are found.

The layers of the older group are slightly folded. In the central part of the island they dip ESE, while on the north-western part they dip WNW.

The younger olivine-porphyritic group is only known from the south-eastern part of the island. The basalts, which have been described by Pedersen (1970), contain titaniferous augite. The layers are nearly horizontal; they overlie discordantly the basalts of the lower, chiefly plagioclase-porphyritic group.

A few dykes consisting of an aphyric basalt cut the upper formation on the western part of the island. Like the upper olivine-porphyritic basalts they contain titaniferous augite, but the content of olivine is smaller. Like most of the faults, the dykes strike NNE.

Interbasaltic sediments are found, as mentioned above, on the north-eastern coast, and in the low coastal cliffs in the area of land-slides on the south coast. Sediments, including a one metre thick coal layer, are found in situ in a steep gully above the south coast. The layers, which occur at a height of about 275 m, are cut towards the coast by a fault, and can only be followed for about a hundred metres.

In the same gully basalts and Tertiary sediments are overlain at a height of 300 metres by late glacial, well sorted layers of clay, sand, gravel and conglomerate. The upper limit of exposures of the basalt seldom exceeds 300 m. It is presumed therefore that the sediments are widely spread on the southern, highest part of the island, although they are only found in a few other localities.

In connection with the investigation on Hareøen samples were collected on the south-west coast of Nūgssuaq west of Itivdle. It was not possible to correlate the plagioclase-porphyritic lavas there with the above-mentioned lithological units from the upper series on Hareøen. However, a body – possibly a sill – at Nūluk consists of the same type of olivine basalt as the upper lava group on Hareøen. The NNE-striking aphyric dykes continue on Nūgssuaq.

At several horizons in the plagioclase-porphyritic series acid or intermediate rocks were found; especially to be mentioned is a 25 cm thick greenish ignimbrite with phenocrysts of aenigmatite.

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CONTINUED INVESTIGATIONS OF QUATERNARY DEPOSITS IN THE AREA BOUNDED BY SØNDRE STRØMFJORD, THE INLAND ICE, AND THE SUKKERTOPPEN ICE CAP

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The 1970 project was a continuation of more general 1969 investigations, some results and the objectives of which were reported by Weidick & Ten Brink (1969). The objectives of 1970 field work were to: (1) accurately determine altitudes and characteristics of marine limits; (2) complete a collection of marine shells and organic material from emerged marine deposits in order to derive a radiocarbon-dated delevelling history; (3) obtain cores of sediments from at least three lakes for pollen analysis and C-14 dating of lake-sea isolation times; (4) map in detail some glacial, glaciofluvial, and marine deposits known from 1969 investigations to be particularly important in reconstruction of Holocene events, and (5) conduct a lichenometric survey on young moraines near the Inland Ice in order to estimate ages of the moraines. All the field objectives were achieved, and the results that can be stated before completion of analyses are summarised below.

Marine limits. In general, within the area under consideration, there is a progressive decrease in marine limit with decreasing distance from the present Inland Ice margin. Beginning with the investigated area farthest from the Inland Ice, the marine limit is 120 ± 10 m a.s.l. in Aussivît at the head of Itivdleq fjord. (All place names are taken from Danish Geodetic Institute map sheets 66 V.1, 66 V.2 and 67 V.2) The limit is rather well defined in Aussivît by shell-rich silts up to 105 ± 10 m, and an uppermost strandline 120 ± 10 m a.s.l.

In the Angujårtorfik-Angujårtorfiup kûa area, c. 35 km up Søndre Strømfjord from Aussivît, the marine limit is very difficult to determine precisely, but is definitely greater than 70 ± 3 m, which is the highest occurrence of unambiguous strandlines, and lower than 134 ± 10 m, which is the upper limit of terraced sediments filling lower Angujårtorfiup kûa. The local marine limit is tentatively believed to be 115 ± 10 m. This judgement is based on the following evidence: (1) 115 ± 10 m is the altitude