

Review of the Survey's activities in 1974

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The Geological Survey of Greenland (GGU) continued activities during 1974 in accordance with its role as the official government department of the Ministry for Greenland responsible for all practical and scientific aspects of geological investigation. A total of 121 people travelled to Greenland in connection with a variety of geological, geophysical, glaciological and hydrogeological projects in 12 areas (fig. 2).

Interest in the mineral and hydrocarbon potential of Greenland gained new impetus during 1974 as a result of the general energy crisis. GGU has continued to advise the Ministry on matters concerning concession rights for exploration and extraction of mineral and hydrocarbon resources and, together with the geological institutes of the University of Copenhagen, supported the initiative taken by the Danish Natural Science Research Foundation (Statens Naturvidenskabelige Forskningsråd) with respect to new investigations in Greenland related to economic potential. Interest in the hydrocarbon potential of the West Greenland shelf culminated during 1974 with the Ministry of Greenland inviting applications for concessions in three areas. By the closing date 22 formal applications were received. Details concerning the allocation of concession areas were announced in April 1975. Recent developments in this field in which GGU has advised the Ministry are summarised by Henderson (this report).

Examination of suitable sites for proposed uranium mining has taken place in the Kvanefjeld area of South Greenland, while a group of Survey geologists have again been involved in prospecting for radioactive minerals in East Greenland. Programmes of hydrochemical analysis formed part of these investigations and have been undertaken in connection with environmental assessment of the effect of lead and zinc mining at Mårmorilik, central West Greenland (see Asmund, this report). A large environmental programme has also been initiated in South Greenland (Bohse *et al.*, this report).

Interest in exploration and exploitation of other minerals remains high, with 25 companies holding concessions at the end of 1974.

Personnel

The number of permanent staff employed by GGU in Copenhagen increased substantially during 1974. 32 geologists and chemists were employed, together with 61 administrative, laboratory, technical and maritime personnel. As in previ-

ous years, a large number of scientific and support staff were engaged on contract in relation to field work in Greenland. Students from Danish universities served as field assistants while a number of Greenlanders were hired locally to act as assistants and crew members on GGU vessels.

Field operations in Greenland

The main areas of GGU activity in Greenland during the June–September field season of 1974 are shown in fig. 2. Field parties travelled to Thule Air Base, Søndre Strømfjord and Narssarsuaq by scheduled flights from Copenhagen. One party travelled to East Greenland by direct charter from Copenhagen while a second, involved in airborne geophysical work off the East Greenland coast, travelled via Iceland. A third group travelled from Iceland to Kap Harald Moltke, Peary Land, North Greenland, in an ice reconnaissance aircraft attached to the Meteorological Institute.

Air support was by Bell Helicopters owned by GGU* and Heliswiss A/S, Bern, and a jet ranger on hire from Kryolitselskabet Øresund. Aircraft were chartered from Greenlandair Charter A/S in co-operation with Vængir Airtransport Co., Iceland, and Bradley Air Services, Carp, Ontario. The Ministry of Defence, Meteorological Institute and Nordisk Mineselskab generously provided air transport of equipment and personnel between Copenhagen and Greenland and in Greenland. Surface transport was by GGU cutters, outboard motor-boats and 'all-terrain' motor-cycles, as well as M.V. *Tycho Brahe* chartered from the Geodetic Institute.

Projects

Field work undertaken by GGU in 1974 can be grouped into several categories:

- (a) geological mapping
- (b) Quaternary investigations
- (c) geophysical surveys
- (d) geochemical programmes
- (e) economic investigations
- (f) special topics

(a) Geological mapping was undertaken in North Greenland and in several areas in West Greenland.

In North Greenland reconnaissance mapping was carried out on the coastal areas between Thule and Savigsivik in Melville Bugt (Dawes).

* GGU's last remaining helicopter, *Pollux*, crashed on take off at Midgård at the end of the 1974 field season, fortunately without injury to the pilot.

In the area between Disko and Svartenhuk Halvø, central West Greenland, a mapping programme on the Late Phanerozoic sedimentary and volcanic rocks was continued (Schiener & Henderson).

Detailed mapping of the Archaean basement continued in southern West Greenland. A large party based on Midgård was involved in mapping in the Godthåbsfjord district, the Buksefjorden area and in the Fiskenæsset region (Allaart; James; Chadwick *et al.*; Kalsbeek; Escher & Myers).

(b) Quaternary investigations during 1974 were centred upon the Godthåbsfjord area, southern West Greenland (Weidick) and in the area around Kejser Franz Josephs Fjord, central East Greenland.

(c) Geophysical surveys were carried out in several areas, both onshore and offshore, in East and West Greenland. Airborne gamma-spectrometric and magnetic surveys were carried out in East Greenland between 72° and 76°N, in conjunction with radiometric field investigations. An airborne magnetometer survey was made of the shelf off Angmagssalik and the land area north of Mesters Vig, East Greenland. Marine seismic and magnetic profiles were also made in the former area and offshore in southern West Greenland (B. Larsen; H. C. Larsen; Nielsen & Steenfelt).

A palaeomagnetic investigation of Tertiary basalts was performed in central West Greenland where gravimetric and magnetic determinations were made on the sea ice in the spring (Schiener & Henderson).

(d) Geochemical programmes were concerned with prospecting activities in East and South Greenland, and the continued assessment of the ecological effects of the lead and zinc mining at Marmorilik, central West Greenland (Nielsen & Steenfelt; Asmund).

(e) In addition to the geophysical and geochemical prospecting discussed above, Survey geologists were engaged in sedimentological investigations of the central West Greenland basin relevant to assessment of hydrocarbon potential (Schiener & Henderson). Iron mineralisation associated with intrusions in the same area was also studied (Pedersen; Ulff-Møller).

(f) In connection with proposed future mapping activities in North Greenland a party of geologists measured reconnaissance profiles through Lower Palaeozoic sediments in southern Peary Land (Peel & Christie). During the field season the party received ground support from personnel of Count Eigil Knuth's station at Kap Harald Moltke.

Geologists from the University of Leeds collected samples in central East Greenland for radiometric age determination. Tertiary intrusions in the same area were also examined (Engell).

Special sedimentological studies were made of Mesozoic strata in Jameson Land and north of Kejser Franz Josephs Fjord, central East Greenland, with a view to elucidating the conditions under which the rocks were deposited (Birkelund & Heinberg; Surlyk & Clemmensen).

Participation in international projects

GGU has representatives on a number of Danish national committees concerned with participation in a variety of international associations and projects. Included in this category are the 'International Geological Correlation Project', commenced in 1973 under the auspices of UNESCO and IUGS, 'International Association for Quaternary Research', and the 'International Hydrogeological Decade', and 'International Oceanographical Decade', sponsored by UNESCO.

Collaboration with other institutes

GGU has a long tradition of close cooperation with many scientific institutions which is embodied in the employment of large numbers of Danish and foreign summer contract geologists and other staff. Contact is encouraged and maintained with other institutes who share a common interest in Greenland in order to derive maximum benefit from the sharing of resources and exchange of ideas.

The close collaboration enjoyed with the Mineralogical Museum, the mineralogical and geological Institutes of the University of Copenhagen, the Danish Atomic Energy Commission, and the Technical University in Copenhagen, has continued. In particular, an agreement between GGU and the Mineralogical Museum concerning the storage of geological specimens was completed during late 1974.

GGU geologists were joined in the field during 1974 by scientists from these Danish institutions and from the universities of Exeter, Leeds and Manchester, Geological Survey of Canada, Memorial University of St. Johns, Newfoundland, Portsmouth Polytechnic, University College of Wales at Aberystwyth, the Central Geological Survey in Prague and Rheinisch Westfälische Technische Hochschule, Aachen.

The demand for geochemical data, particularly, isotopic age determinations, remains high. Although GGU is continually expanding its own analytical capability (Sørensen) cooperation was undertaken with other institutions, including the universities of Leeds, Oxford and Copenhagen, the Scottish Research Reactor Centre at East Kilbride, Eidg. Technische Hochschule in Zürich, and the Mineralogical and Geochemical division of Bundesanstalt für Bodenforschung in Hannover, National Museum of Copenhagen, and Isotopes Inc., New Jersey.

Survey geologists attended international meetings and symposia throughout the year and contributed to conferences in Canada, Denmark, England, Finland, France, Greece, Norway, Spain and Sweden.

Publications

During 1974 compilation continued of bedrock geological maps on the scales of 1:100 000 and 1:500 000 and on the 1:500 000 Quaternary map series. Two

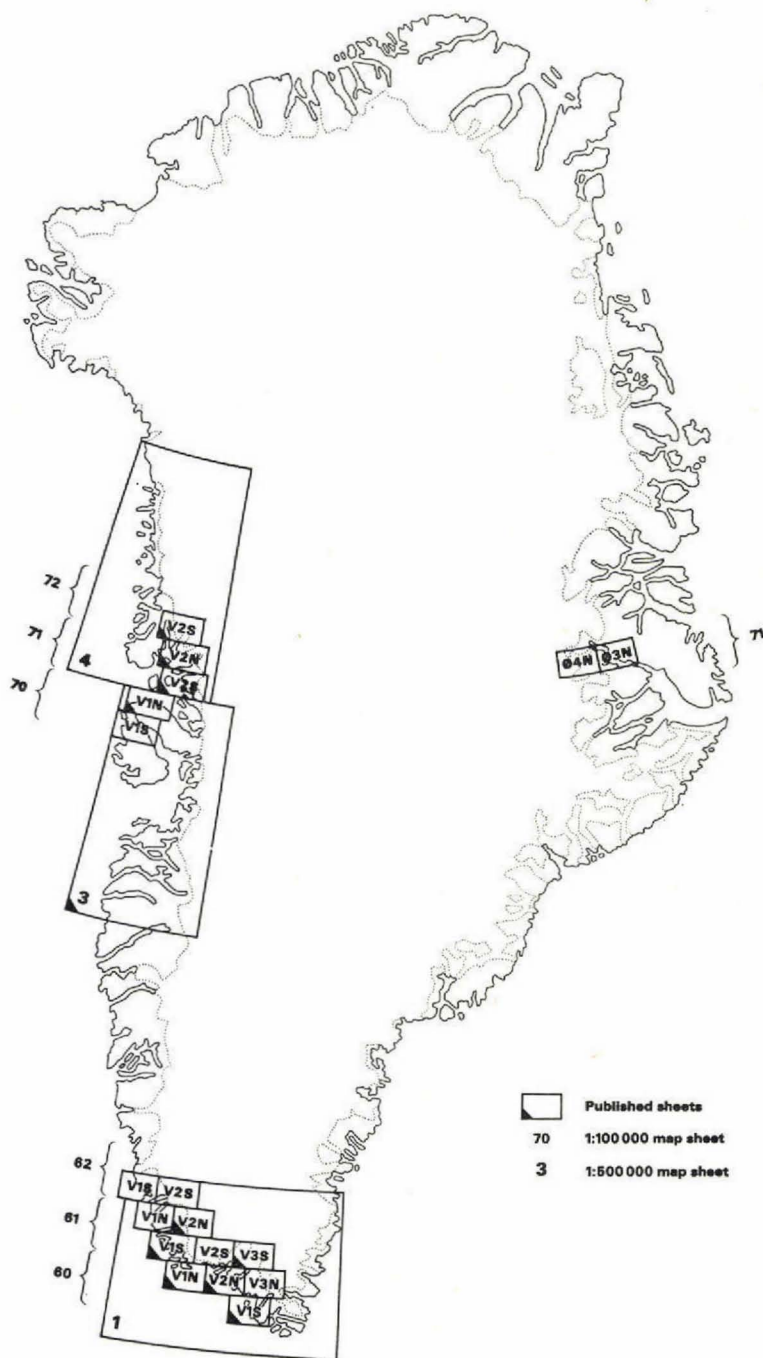


Fig. 3. Map sheets issued and in preparation by GGU (see inside rear cover).

1:100 000 map sheets were published, Agatdal 70 V. 1 N and Midternæs 61 V. 2 N, together with the 1:500 000 Quaternary map sheet Søndre Strømfjord – Nûgssuaq. Details of map sheets available and in preparation are given in fig. 3 and inside the back cover of this report.

Bulletins 108–111, and 114 (published in association with *Meddelelser om Grønland*) and Reports 60 to 67 were distributed during 1974. As in previous years, GGU personnel continued to contribute a large number of articles to international journals. A number of these were issued as Miscellaneous Papers 119 to 138.