

# Review of the Survey's activities in 1992

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The activities of the Geological Survey of Greenland (Grønlands Geologiske Undersøgelse, GGU) in 1992 were strongly influenced by political initiatives to increase interest in the hydrocarbon and mineral resources of Greenland. GGU has supported the Mineral Resources Administration (MRA) with both an international promotion drive to present the investment potential of Greenland to the mining industry and with presentations in connection with a licensing round for hydrocarbon exploration and exploitation offshore West Greenland south of 66°N.

GGU has participated in international congresses, trade fairs, symposia and specially arranged meetings, with emphasis on the presentation of new areas in Greenland with a high potential for hosting economic mineralisations, as well as areas with petroleum potential both offshore and onshore Greenland. GGU has supported the MRA with preparations leading up to the offshore licensing round. In this connection GGU has made a compilation of all geological and geophysical data of relevance for the oil industry. In addition to direct presentations on the mineral resources front, GGU has contributed data and articles to special international publications on Greenland's resource potential. In association with the MRA, publication and distribution has begun of a newsletter directed at the mining industry and containing information and results of mineral prospecting. This newsletter (Greenland MINEX News) is a companion to the newsletter serving the hydrocarbon sector (GHEXIS) which GGU has published since 1990.

In the course of the year GGU has contributed with geological expertise to the MRA in the administrative tasks related to mining companies' prospecting activities in Greenland. GGU has advised Grønlands Energiforsyning (the Greenland Energy Authority) in regard to glaciological aspects of the evaluation of hydroelectric power potential, and the Foreign Ministry Secretariat for the Law of the Sea has been supplied with geological information on the shelf areas surrounding Greenland.

Geological research projects have been carried out in West, South, East and North-East Greenland, including both traditional geological surveying and specialised re-

source oriented surveys. A total of 59 scientific and technical personnel participated in GGU's expeditions in 1992. The scientific, technical and administrative staff in Copenhagen comprised 85 persons.

## **Mineral resource investigations**

In South and South-East Greenland a geological, geophysical and geochemical programme with special emphasis on mineral resource evaluation was initiated (project SUPRASVD). From a base at Prins Christian Sund Telemetry station geological reconnaissance was made along the eastern coastal area of Greenland up to Tingmiarmiut and in areas north and east of Nanortalik in South Greenland. Systematic geochemical sampling of stream sediment and water was made in eastern coastal areas between latitudes 60° 15'N and 62°N; gravimetric measurements were also carried out in the same region. Studies of mineralisations at selected localities were combined with detailed sampling.

The field investigations in South and South-East Greenland were backed up by a technique, hitherto little used in Greenland, of utilising satellite data for control and interpretation of geological structures. Reconnaissance geological maps were produced on the basis of the satellite data. The project in South and South-East Greenland included geologists from England and Canada, and was carried out with financial support from the MRA.

Other mineral resource related investigations in 1992 included systematic sampling of stream sediments and water in an area of 14 500 km<sup>2</sup> between Aasiaat/Egedesminde and Maniitsoq/Sukkertoppen. The main aim was to localise geochemical anomalies of particular interest to mineral prospecting, but general geological reconnaissance studies were also made. In addition, local geochemical and mineral resource studies were undertaken in the Svartehuk Halvø region.

South of Aasiaat/Egedesminde and Qasigiannuit/Christianshåb airborne magnetic measurements over an area of 8000 km<sup>2</sup> were carried out by a Canadian geophysical company in co-operation with GGU, and with the financial support of the MRA and Nunaoil A/S. These geophysical studies contribute to an evaluation of

the structure of the area and the possible presence of mineralised areas.

### **Petroleum geology**

GGU's largest field activity in 1992 was mainly concerned with investigations of direct relevance to petroleum geology. It was supported from a base at Uummanaq, and was the final season's activity of a four summer project undertaken in close cooperation with geologists and students from the universities in Copenhagen and Århus, and financed in part by a special grant from the Ministry of Energy. Studies of the sedimentary successions on land were undertaken as part of a programme to evaluate the source rock potential of sediments in the offshore regions. In addition to normal sampling of the sediments 12 drill borings with an average depth of 67 m were made on Nuussuaq and Svartenhuk Halvø with the object of obtaining fresh material for micropalaeontological and source rock studies. In the course of field work oil impregnated basalts were discovered in surface outcrops. In connection with the petroleum geological studies, investigations were continued on the Tertiary basalts of Nuussuaq.

Offshore West Greenland seismic data were collected between latitudes 66° and 68°N by the Danish Navy's fisheries inspection ship *Thetis*, with funding from the MRA and with Nunaoil A/S as contractor. A total of 3017 line kilometres of seismic data were collected as part of the regional hydrocarbon investigation of offshore areas.

In East Greenland detailed studies of selected profiles were made in Jameson Land as part of a joint project with the University of Copenhagen, the objective being to gain a better understanding of the factors governing deposition of reservoirs and source rocks for hydrocarbons.

### **Glaciological studies**

The glaciological studies of GGU comprised various investigations related to evaluation of hydropower potential, and participation in international climate studies. Glaciological investigations related to hydropower exploitation were continued south of Nuuk/Godthåb. In South Greenland, north-east of Qaqortoq/Julianehåb, glaciological studies were initiated in co-operation with

Grønlands Energiforsyning (the Greenland Energy Authority) and Grønlands Forundersøgelser (the Greenland Field Investigations). North of Ilulissat/Jakobshavn GGU completed the hydropower studies on the Inland Ice and continued an international climate research project supported by the EEC. Further climate studies were conducted south of Søndre Strømfjord in association with a research group from the USA. Glaciological studies were also continued in North-East Greenland at the margin of the Inland Ice as part of an international climatological research project in co-operation with and supported by the Alfred Wegener Institute in Germany, the Commission for Scientific Research in Greenland and the Danish Polar Center.

### **Other research activities**

In connection with the international Ocean Drilling Program (ODP) a seismic survey was carried out on the East Greenland shelf off Tasiilaq/Ammassalik as a cooperative venture between GGU, the University of Århus and the Geological Survey of Denmark, financed by the Danish Natural Science Research Council. The 2800 km of shallow seismic lines covered areas scheduled to be drilled by ODP in 1993 and possibly in 1994 as part of an investigation of volcanic and tectonic processes that took place during the Tertiary opening of the North Atlantic.

In North-East Greenland new studies and collections were made from high pressure ultrabasic rocks (eclogites) in co-operation with a geologist from the New York State Geological Survey. The wide extent of this eclogite province was first revealed during the 1990 expedition to North-East Greenland.

### **Publications**

In 1992 GGU published a special 1:250 000 coloured geological map of part of East Greenland between 72° 25'N and 74° 30'N and a descriptive text to accompany the two published 1:500 000 geological maps of North Greenland (sheets 7 and 8). Two numbers of the Bulletin series, six numbers of the Rapport series and 10 numbers of the Open File Series were also issued. As a consequence of GGU research activities 24 articles were published in international scientific journals.