

New perspectives for Greenland geological research

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The year 1994 was again a busy and eventful one for GGU, with almost record activity in Greenland in the summer months. In the autumn activities were overshadowed by a political decision to amalgamate the Geological Survey of Greenland (GGU) and the Geological Survey of Denmark (DGU) to form a single national geological survey, the Geological Survey of Denmark and Greenland (abbreviated GEUS). The acronym GEUS for the new institute is derived from the Danish name for a geological survey (**GE**ologisk **U**nder**S**øgelse). Following the Danish general election of September 1994, the combination of two formerly separate ministries into a single new Ministry of the Environment and Energy also resulted in GGU and DGU becoming for the first time the responsibility of a single minister (Svend Auken), and the proposed amalgamation of the two surveys was one of his early initiatives. Directors and staff of both GGU and DGU have been fully occupied with consideration and implementation of the consequences of this decision, and formal establishment of the new survey was effected from mid-1995. The creation of a single national geological survey, covering a wide range of geological disciplines, will strengthen the Greenland work, especially in respect of oil and gas exploration and climatic research.

A decision was also taken in late 1994 to station two geologists at the Mineral Resources Office of the Greenland Home Rule Authority in Nuuk, Greenland. The first representative in Nuuk will take up his post in mid-1995 for a two-year period.

Another important event of 1994 was the establishment of the Danish Lithosphere Centre (DLC) in February, a new research centre dedicated to plate-tectonic studies in West and East Greenland. The centre is funded by the Danish National Research Foundation for a period of 5 years with a total grant of 70 million kroner. Administration of the new centre is linked to GGU. Field activities in 1994 were carried out in close cooperation with GGU, and the Geological Institute and Geological Museum of the University of Copenhagen.

GGU and the Mineral Resources Administration for Greenland (MRA) continued their joint information services directed at the international oil and mining industry. This service includes presentation of results and geological relationships relevant to resource prospecting at meetings, symposia and exhibitions, as well as production of the *Ghexis* (oil and gas) and *Minex* (minerals) newsletters.

Efforts to make geological data, in the form of reports or digital data, readily accessible to companies have continued.

On behalf of the Mineral Resources Administration for Greenland GGU carried out inspection visits to company drilling activities in the summer and autumn: Falconbridge Greenland A/S on Nuussuaq and Disko, grønArctic Energy Inc. on Nuussuaq and Platinova A/S at Citronen Fjord in North Greenland. In addition GGU has carried out routine investigation and evaluation of the geological aspects of mineral resource developments in Greenland for the MRA. GGU has contributed a series of lectures concerning oil possibilities at a seminar for the politically appointed nominees attached to the joint Greenlandic–Danish Committee on Mineral Resources, which was followed by a visit to GGU's laboratories.

The previous Minister for Energy, Jann Sjørnsen, visited GGU's field activities in eastern North Greenland between 27th July and 2nd August 1994. Nine members of the joint Greenlandic–Danish Committee on Mineral Resources, together with nine officials and guests, visited the GGU base camp at Centrum Sø on 12th August during a tour of North Greenland.

Geological, geochemical, geophysical and glaciological projects were carried out throughout Greenland in 1994. A total of 84 scientific and technical staff (including 22 from international research institutes) participated in GGU's expeditions in 1994, in addition to the projects organised by DLC (see separate review by the director, H. C. Larsen, elsewhere in this Report). The permanent staff of 81 based in Copenhagen was supplemented during the year by an additional 16 associated with externally financed projects. There are a further 12 staff at the Danish Lithosphere Centre, administered by GGU.

Petroleum geology

Oil geological investigations were carried out in North Greenland in the Palaeozoic and Mesozoic sediments, with a view to evaluating the oil potential of areas offshore the northernmost segment of the East Greenland shelf.

Oil geological studies were continued in the Jameson Land basin of East Greenland in association with staff from the University of Copenhagen, with detailed profile measurements at selected localities.

In West Greenland oil geological and geophysical investigations were carried out on Nuussuaq and the west-

ern part of Svartehuk Halvø, in co-operation with staff of Copenhagen and Aarhus universities. The work was concentrated on the areas of Nuussuaq where oil seeps have been located in surface outcrops of basalt. One aim of the studies on Svartehuk Halvø was to select a site suitable for drilling a stratigraphic well in 1995.

Interpretation of seismic data collected offshore south of latitude 68°N was completed. Of particular interest is the presence of 'flat-spots' in the Fylla structural complex west of Nuuk, which may indicate the presence of very large quantities of hydrocarbons.

In co-operation with Nunaoil A/S, and in a consultant capacity, GGU has completed interpretation of seismic data from Melville Bay. The data have revealed large structures which could form traps for hydrocarbons.

Geological mapping

Systematic geological mapping at 1:500 000 was continued with a major project in eastern North Greenland, working out of a base camp at Centrum Sø. Most activity was concentrated in the region 78°–81°N, but with some support to groups working as far south as Danmarkshavn and as far north as Peary Land. The project includes structural, stratigraphic and sedimentological studies of the Caledonian fold belt as well as foreland areas to the west, and petroleum and mineral resource investigations.

In connection with the continued mineral resource investigations in South Greenland, geological mapping was completed of one 1:100 000 map sheet.

In West Greenland studies of the Nagssugtoqidian fold belt were carried out by a GGU/DLC group between Sisimiut and Disko Bugt, with the emphasis on collections for isotopic age studies and plate tectonic relationships.

Mineral resource investigations

The mineral resource evaluation project in South Greenland (project SUPRASID) was continued in 1994, with aspects of ore geology, geochemistry and isotopic analysis as the main study areas.

In East Greenland ore geology studies were carried out in Jameson Land. Laboratory studies of the gold-palladium mineralisation associated with the Skaergaard intrusion were undertaken in co-operation with groups from the Geological Institute of the University of Copenhagen.

Large rock collections of kimberlite were made in West Greenland, with the purpose of evaluating the diamond potential of the area between Maniitsoq and Disko Bugt.

Systematic collections of stream sediments were made in association with the regional mapping project in eastern North Greenland. Studies of copper and lead mineralisation were carried out as follow-up work on anomalies revealed by the 1993 geochemical prospecting in the area.

A 5-year airborne geophysical survey project financed by the Greenland Home Rule authorities was initiated in 1994 with the Inglefield Land region as the first study area. The purpose of the project is to collect data which will encourage prospecting by international mining companies.

Glaciology

GGU's glaciological investigations in the field of climatic research have continued with funding from the European Union, the Nordic Council of Ministers, the Danish Natural Science Research Council and the Danish Polar Center. Studies have been concentrated on Hans Tausen Iskappe in Peary Land and the Inland Ice margin in Kronprins Christian Land, both in North Greenland, and on the Storstrømmen glacier west of Danmarkshavn in North-East Greenland. Research scientists from the Niels Bohr Institute, Copenhagen, and from Iceland, Norway, Sweden and Germany took part in these projects.

In West Greenland another international research group continued palaeoclimatological studies on the Inland Ice margin north of Ilulissat/Jakobshavn.

In 1994 GGU was once again represented in the Nordic Antarctic programme, with a glaciologist joining a Norsk Polar Institute expedition to Dronning Maud Land.

Publications

In 1994 GGU published a coloured geological map at 1:250 000 of the area between Jakobshavn Isbræ and Nuussuaq, and a new volume in the Thematic Map series containing a set of 71 thematic maps (mainly compilations of geochemical data) of the area between Kap Farvel and Ivittuut at scale 1:1 000 000. One volume in GGU's Bulletin series, five volumes in the Report series and nineteen numbers of the Open File Series were also issued. As a consequence of GGU research activities 57 articles were published in international scientific journals, including the GGU Rapport and Bulletin series.