

Sampling of measured sections for palynological and other investigations between 69° and 72°N, central West Greenland

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The objective of the programme was to establish a grid of accurately measured standard stratigraphical sections with a closely spaced sampling interval. The samples are being initially processed for palynological investigations by the writer, and also for a specific study of dinoflagellate cysts under a project financed by the Danish Natural Science Research Foundation (SNF). Selected samples are being used for organic geochemical studies (Schiener, this report). The collection could possibly also be the basis for a study of non acid-resistant microfossils. The programme is a continuation of work done in earlier years (Schiener, 1974; Schiener & Henderson, 1975) and forms part of a basin study.

With drilling being imminent in the concession areas offshore West Greenland it is considered essential to obtain as precise stratigraphical data as possible from the Cretaceous-Tertiary clastic sections of the Nûgssuaq embayment. In this context spores and pollen will be of importance in the fluvial-deltaic sediments and dinoflagellate cysts where marine facies are present.

The area (fig. 10) was covered by two field groups working on complementary sections with the intention of exchanging data and sample material. The writer led one party with three assistants and the second was led by J. M. Hansen (Univ. of Copenhagen) with one assistant (Hansen, this report). A total profile of 14.5 km distributed over 33 sections was measured during the eleven week season. The GGU motor cutter *K. J. V. Steenstrup* with Andreas Viðstein as skipper provided logistic support and communications. Transport

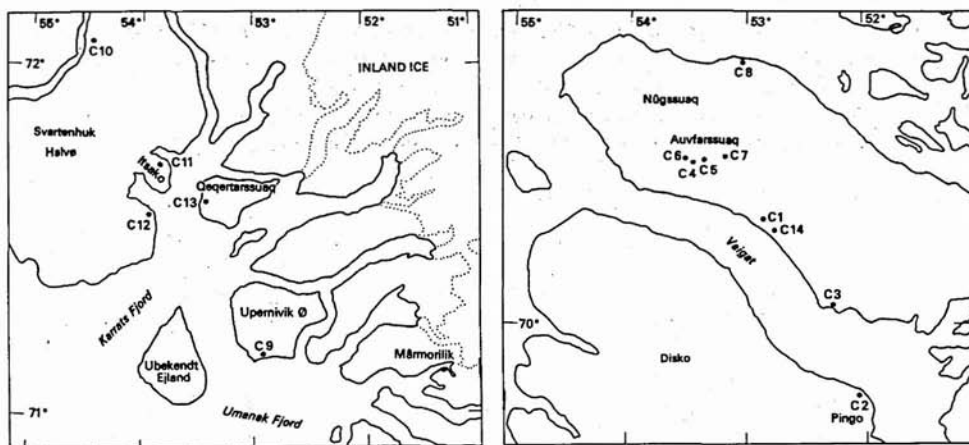


Fig. 10. Map of central West Greenland between 69° and 72°N showing the localities of measured Cretaceous-Tertiary sections (see also fig. 13).

inland was facilitated by six Honda ATC 90 motor tricycles. On several occasions personnel and samples were transported by helicopter on charter to ARCO Greenland based at Qutdligssat.

Southern Nûgssuaq and Disko

At the start of the season a profile east of Áta on the south coast of Nûgssuaq (C1) was examined jointly by both parties. This 865 m section through the Atane Formation (Cretaceous) to the overlying Tertiary basalts was measured with a tape, compass and Abney hand-level technique. As with all sections worked, sedimentological descriptions of units measured were made with some attention to palaeodirections. Unfortunately, however, exposure proved rather inadequate for detailed sampling. Theodolite readings, using a base line triangulation were made on intermediate points of the measured section.

The writer's party continued taping and sampling sections from the lowermost outcrop to the overlying basalts in the Pingo area south-east Disko (C2) where theodolite readings were also taken. The predominant coarse-grained current bedded sandstones at the base of the section are overlain by a dark shale member with tuff bands which has been correlated with the Naujât Member of the Upper Atanikerdluk Formation (Paleocene) Henderson *et al.*, 1976). The upper part of the section is a deltaic facies with coal seams and is cut by a prominent 30 m sill of columnar dolerite. The section at Pisigtajap kûa (near Atanikerdluk) (C3) incorporated the Atane Formation and continued upwards into the Upper Atanikerdluk Formation. An 80 m interval of sediments at Inalugârssuit (west of Pautût) (C14) was also examined and sampled as a continuation up to the lowest basaltic horizon of a section through the Atane Formation measured by T. Jürgensen (Univ. of Copenhagen) in 1974. J. M. Hansen using a Jacob's staff method worked in four sections on the north coast of Disko totalling 930 m (M11–M14; fig. 11) and also examined the Upper Atanikerdluk Formation at the type locality.

Central Nûgssuaq

Both parties were moved to Marrait in late July and proceeded into the Auvfarssuaq valley to examine the Cretaceous and Paleocene sections in the interior of the Nûgssuaq peninsula. J. M. Hansen continued into Agatdalen where a total of 220 m was measured and sampled (M18–M23).

The writer worked on four sections on the northern side of the valley (C4, C5, C6, C7). The sections are predominantly the deltaic facies of the Atane Formation with the possibility of the youngest strata beneath the basalts having a more marine character. In Qâtunat ilordlit (C5) a conglomeratic sandstone was found overlying a shale and sandstone sequence and it included fragments of *Baculites*, an ammonite genus of which several Senonian species have been recognised in West Greenland (Birkelund, 1965). The section in this gully is complicated by faulting, but two further horizons of conglomeratic sandstone were observed in the overlying sandstone and shale sequence. On the return to Marrait J. M. Hansen moved into the Itivdle valley where an 1100 m section of predominantly marine strata was measured and sampled (M24).

Northern Nûgssuaq

In mid-August the writer worked on a section of the Kome Formation (Lower Cretaceous) east of Ikorfat (C8). The section, which consists of a lower series with predominant dark siltstones overlain by a sandstone series with a characteristic basal member of approx. 60 m thickness, is complicated by three faults aligned approximately parallel to the coast. The total stratigraphic thickness is probably about 450 m. J. M. Hansen at a later date moved into the bay west of Ikorfat where five profiles with a total thickness of 1670 m (M25–M29) were measured and sampled in the thick, but rather variably exposed, marine Upper Cretaceous to Tertiary black shales.

Upernavik Næs, Qeqertarsuaq and Svartenhuk Halvø

The writer's party worked on several sections in the northern sedimentary areas. The down-faulted sedimentary block of Upernavik Næs (C9) is calculated to consist of a total thickness of 1700 m of sediments of which about 1350 m are exposed. This block comprises medium- to coarse-grained cross-bedded sandstones interbedded with fine-grained wavy-bedded greenish sandstones and siltstones with abundant plant fragments. The section is cut by numerous minor basaltic sills and dykes. The Qeqertarsuaq section (C13) is lithologically comparable with that of Upernavik Næs. The three Svartenhuk Halvø sections were located on the east side of Umíarfik (C10), north-east Itsako (C11) and Niaqornakavsak (C12). The uppermost part of the Itsako section which is cut by several sills includes a 5 m conglomerate with sandstone boulders up to 50 cm in size. In Niaqornakavsak the 250 m section of ferruginous shales is also cut by many minor intrusions.

Summary

In total about 1400 sedimentary samples were collected from 33 measured sections located throughout the Nûgssuaq embayment (fig. 10). The sections are being drafted in a standard format.

Preliminary impressions based on a study of previously collected material and on the few samples from 1975 processed so far, are of rich and varied spore and pollen assemblages with occasional dinoflagellate cysts. The state of preservation is generally good, but the residues include much woody and cuticular tissue. Of the various lithologies processed the siltstones appear to be the most productive whereas residues from coals often yield low percentages of exinitic material. Of interest in a regional setting is the occurrence in the Late Senonian of species of *Aquilapollenites*, an angiospermous pollen form of unknown affinity with a restricted stratigraphical range and geographical distribution (Hughes, 1973).

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Microplankton and sedimentological studies in the Nûgssuaq and Disko region, central West Greenland

Jens Morten Hansen

In 1975 the Danish Natural Science Foundation (SNF) and the Geological Survey of Greenland (GGU) initiated an investigation of the microplankton (dinoflagellate cyst) of the Cretaceous and Tertiary sediments in central West Greenland. The purpose of this investi-

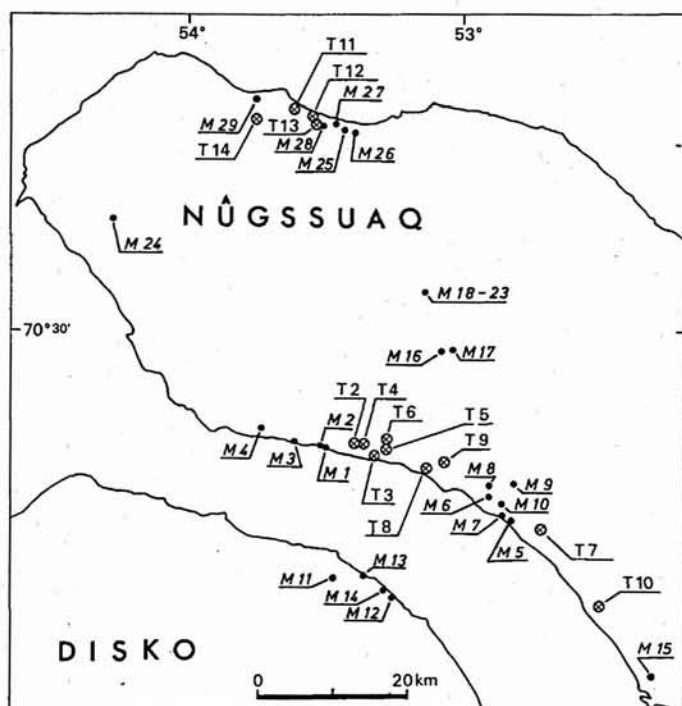


Fig. 11. Map showing the location of measured sections on Nûgssuaq and the adjacent coast of Disko, central West Greenland.