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Precambrian geology of the Disko Bugt region, West Greenland

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Cover

Unconformity between Archaean greenstones and Palaeoproterozoic metasedimentary rocks of the Anap nunâ Group on Qapiarfit, north-east of Disko Bugt. The rocks of the Anap nunâ Group, to the right of the river, are here hardly deformed and at very low metamorphic grade. The lower part consists of a marble conglomerate and is overlain by dark sandstones and siltstones, within which sedimentary structures are well preserved. Photo: A.A. Garde.

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Preface

Between 1988 and 1992 the Geological Survey of Greenland (GGU) launched a number of expeditions to the Disko Bugt region in central West Greenland (Fig. 1), the 'Disko Bugt Project' (Kalsbeek 1989, 1990; Kalsbeek & Christiansen 1992; Christiansen 1993). The aim of this project was threefold. Firstly, it was important to enhance the general geological knowledge of the region, especially the eastern (Precambrian) parts being rather poorly known. Secondly, reconnaissance studies by Kryolitselskabet Øresund A/S in the 1970s and early 1980s and follow up investigations by GGU had revealed mineral showings with Cu, Zn, Au and Ag, which required further investigation. The third

major aim of the Project was to obtain more information on the development of the onshore part of the late Phanerozoic West Greenland Basin, which is particularly relevant to the hydrocarbon potential of the basin.

This volume reports on the Precambrian geology of the region. Work was centred on the area around the abandoned settlement Ataa (Fig. 2), where many mineral showings had been recorded within Archaean supracrustal rocks. Although this area was visited by various geologists in the 19th and in the beginning of the 20th century, the first detailed geological map was made by Escher & Burri (1967; this paper also summarises earlier work). These authors, however, were unable to distinguish the Archaean supracrustal rocks from the early Proterozoic metasedimentary sequences which were later shown to occur in the area (Fig. 2), essentially because routine radiometric age determinations were not then available. Moreover, the hypothesis of massive alteration of rocks by 'granitisation' processes was adhered to by many geologists working in Greenland at that time, which heavily influenced the interpretations (and, to some extent, the map) of these authors. Therefore, although the map of Escher & Burri (1967) was useful during the Disko Bugt Project, new field studies were necessary.

The Disko Bugt Project was thus inaugurated and a base camp was erected at Ataa, from which field work in the Precambrian basement was carried out in 1988, 1989 and 1991. The work was carried out in close co-operation with the Geological Institute of the University of Copenhagen; several staff members took part in the mapping, and five students wrote their Danish (cand. scient.) theses on various aspects of the Precambrian geology of the region.

Results of the field investigations have earlier been documented by the 1:250 000 geological map 'Precambrian Geology between Qarajaq Isfjord and Jakobshavn Isfjord, West Greenland' (Garde 1994), and a sheet in the Survey's 1:100 000 series Geological map of Greenland, Ataa 69 V.3 Nord (Escher 1995). The 1:250 000 map sheet is included with this volume.

The present volume contains 14 papers describing various aspects of the Precambrian geology of the Disko Bugt region. The first paper presents a broad overview of the geology of Nuussuaq and the area north-east of Disko Bugt (Fig. 1), and serves as an introduction

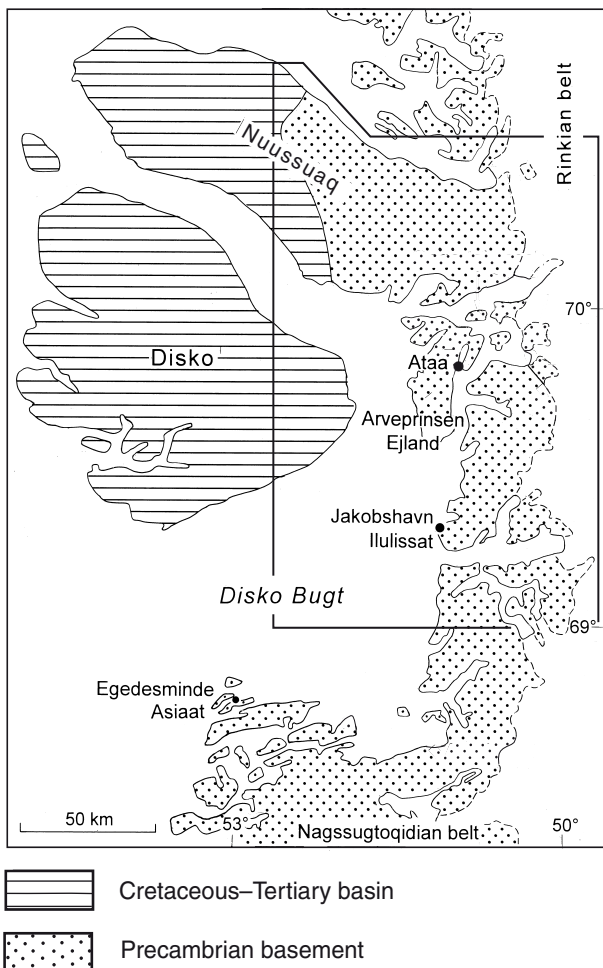


Fig. 1. The Disko Bugt region with the Precambrian basement in the east and the onshore part of the Cretaceous-Tertiary West Greenland Basin in the west. The figure also shows the outline of the 1:250 000 geological map (Garde 1994) enclosed with this volume.

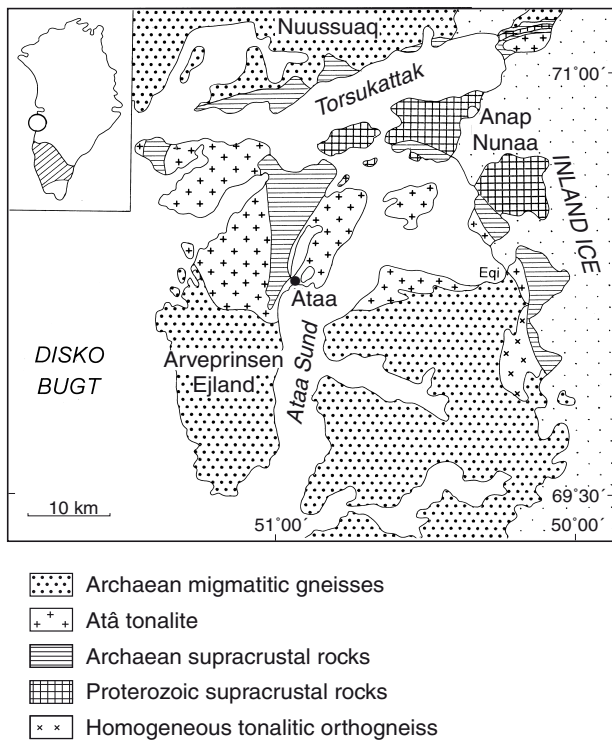


Fig. 2. Geological sketch map of the Ataa area north-east of Disko Bugt.

to the following contributions and as a description of the 1:250 000 map of Garde (1994). This is followed by three papers with geochronological data, dealing with the original formation age of the rocks and with the age(s) of later metamorphism. It is shown that, although most rocks in the Disko Bugt region were formed during the late Archaean, early Proterozoic overprinting has been intense. The next five papers describe lithostratigraphic units in the Ataa area, with emphasis on the Archaean supracrustal rocks. The latter are much better preserved here than is generally the case elsewhere in Greenland, and show many similarities with the greenstone belts which occur, for example, in the Canadian Shield.

Next follow two papers which describe the gold mineralisation locally associated with Archaean supracrustal sequences; interestingly, the setting of the gold mineralisation at the two localities is very different. The final three papers deal with the structural evolution of the region. Although it is often difficult to distinguish between Archaean and early Proterozoic structures, it is evident that early Proterozoic tectonism has had a major impact on the present-day structural grain of large parts of the Disko Bugt region.

For several reasons publication of this volume has been much delayed. Anticipated papers on regional aspects of the mineral potential of the region and on geophysical investigations carried out during the field work have not materialised, but may be published at a later date.

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