A change in the status of the Greenland Inland Ice

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Observations on the status of the Greenland ice cover are registered at the Geological Survey of Greenland (GGU) on a routine basis. During the past two decades studies have been particularly related to technical activities such as hydro-electric power, but more recently there has been increasing interest in the significance of glacier variations as indicators of climatic change. However, whereas local glacier variations are usually related to climatic changes on the time scale of a few decades or centuries, documented changes in the status of the margins of the Inland Ice in the literature are mainly related to long term climatic fluctuations on the time scale of thousands of years or more.

Due to the great size of the Inland Ice there is a considerable range in regional and local dynamics; conditions of low altitude sea-based parts of the Inland Ice margin with relatively high ablation contrast with the conditions of high altitude land-based parts of the Inland Ice margin. Documentation is most comprehensive for South and West Greenland between latitudes 59° 30′N and 70°N, where a 1200 km long segment of the Inland Ice, for purposes of a glacier inventory in connection with hydro-power studies, was divided into 267 sectors. The status of each of these sectors was assessed from studies of aerial photographs for the period about 1950 and the period about 1985. A fuller discussion of the significance of fluctuations in the positions of the Inland Ice margin, on their interpretation, and on exceptions to the general trends, can be found in Weidick (1991). The trends are summarised in Fig. 1, where the red colour indicates those sectors of the Inland Ice margin in recession and the blue colour those sectors in a state of advance. In general terms recession can be equated with thinning of the ice margin, and advance with thickening of the ice. In Fig. 1 the width of the coloured areas gives an indication of the relative degree of recession or advance.

As shown on Fig. 1, at about 1950 the greater part of the Inland Ice margin in South and West Greenland was receding. Recession (thinning) was particularly marked in the areas of Qagssimiut, Frederikshåb Isblink, the head of Godthåbsfjord (Kangiata nunâta sermia) and around Jakobshavn Isbræ. This widespread recessive status of the Inland Ice margin is believed to have been part of the general recession since the major historical (neoglacial) maximum in the middle or last half of the 19th century. As discussed by Weidick (1968, 1991) there are exceptions to this general picture.

By about 1985, a change in status is apparent for the greater part of the Inland Ice margin, and many sectors which showed retreat in 1950 were by 1985 in a state of advance (Fig. 1; cf. also Warren, 1991). However, areas of continuous retreat persisted locally, notably around Frederikshåb Isblink, Kangiata nunâta sermia and areas north of Jakobshavn Isbræ. Weidick (1991) concludes that the zone of readvance at present is spreading from the highland Inland Ice margins to the lowland regions, and can be expected also to spread to these remaining areas of recession in the future.

Independent evidence for recent advance (thickening) of the Inland Ice comes from geodetic measurements along the so-called 'EGIG-line', shown in Fig. 1 (Seckel, 1977), and from satellite altimetry over the southern part of the Inland Ice (Zwally *et al.*, 1989). However, as discussed by Weidick (1991) reported thickness increases have been questioned (e.g. by Douglas *et al.*, 1990). Accumulation trends determined from records of ice cores in general show increased precipitation in warm periods, but in detail ice flow from locations upstream of the drilling sites can cause difficulties in exact interpretation of accumulation changes (Reeh *et al.*, 1985). Thus, while a general increase of accumulation over the southern part of the Inland Ice since the 'Little Ice Age' (around A.D. 1600) is considered probable, it cannot yet be fully substantiated. The possible influence of a warmer climate due to the 'greenhouse effect' which might reverse the readvance trend or reinforce it, is a topic of continuing study within GGU and elsewhere.

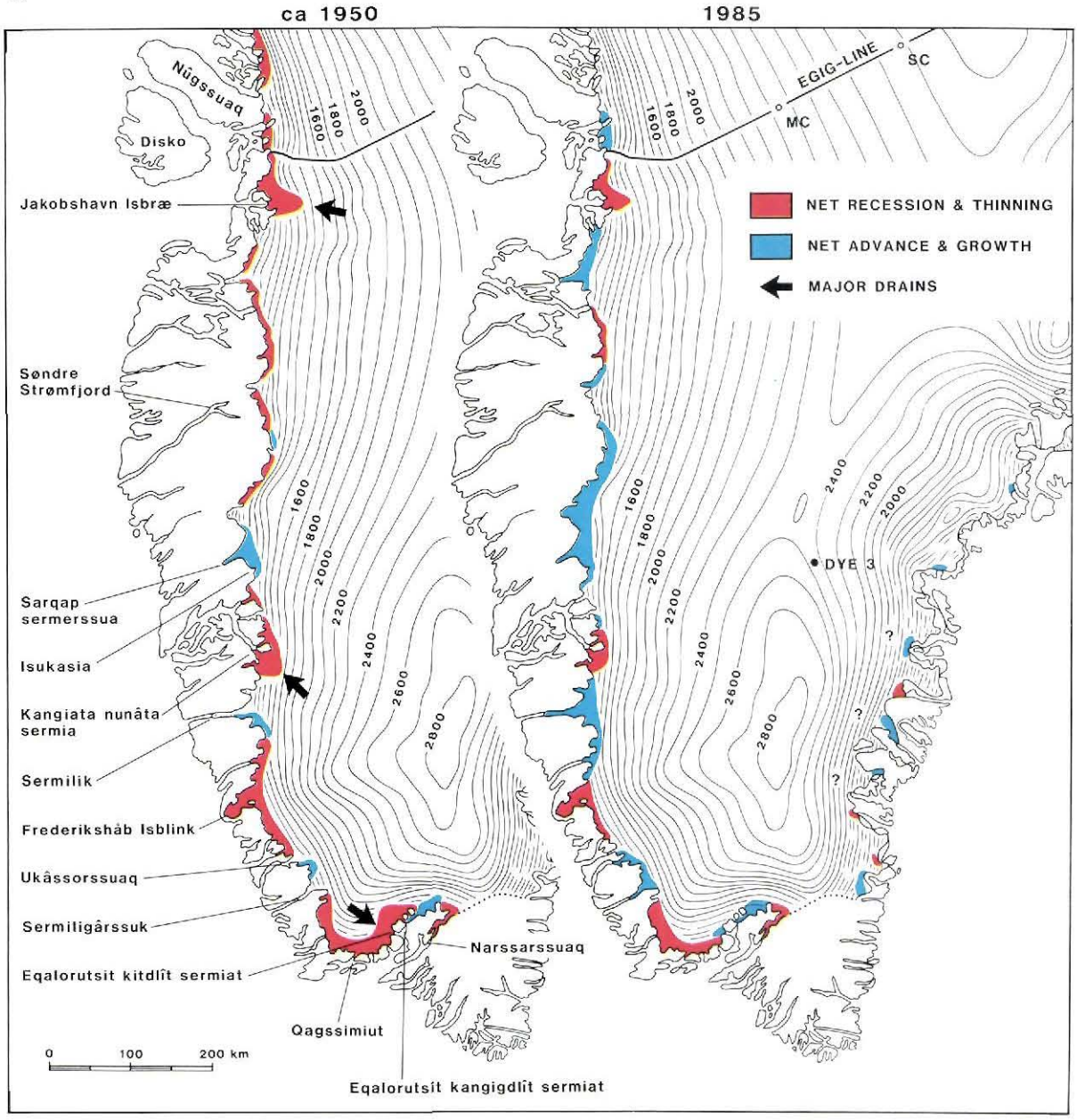

Fig. 1. Marginal activity of the Inland Ice in South and West Greenland in 1950 and 1985. Widths of the coloured zone indicate estimates of intensity of net thinning/recession or net thickening/advance. The trend of the western part of the 'EGIG-line' is shown with the stations of Milcent (MC) and Station Centrale (SC). The position of Dye 3 station is also shown. Contour lines after Bindschadler *et al.* (1989).

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Economic mineral resources: activities in 1990

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The most exciting discovery in mineral exploration in Greenland in 1990 was announced by Platinova Resources Ltd. and Corona Corporation. A single pack-sack drill hole intersected a gold-platinum rich zone in the layered mafic Kap Edvard Holm complex of East Greenland (Fig. 1). The mineralised zone consists of an upper gold-rich section overlying a platinum-rich section. Gold values averaged 2.6 ppm over 1.5 m while the bottom section of the hole yielded 3.4 ppm platinum. Surface sampling indicates that the platinum mineralisation extends 1.5 to 2 m below the bottom of the drill hole. The mineralised zone occurs in a well-defined layered sequence which can be followed for more than 10 km.

The Kap Edvard Holm complex is located 12 km south of the Skaergaard intrusion (Fig. 1) where the same joint venture partners completed a 12 000 m drilling programme on an extensive gold-palladium mineralisation. The modes of occurrence of the two mineralised zones are similar. Both intrusions belong to the Tertiary magmatic province of East Greenland that stretches along the coast for more than 1000 km (Fig. 1). Gold-bearing hydrothermal veins and anomalous gold values have previously been reported and are related to the felsic igneous activity of the province (Thomassen, 1990b). The province is also known for its porphyry molybdenum occurrences.

Although the present knowledge of the metallogenesis of the Tertiary tectono-magmatic province is fragmentary, the mineral discoveries indicate that the entire province is an interesting exploration target. The most recent general review of the province is given by Nielsen (1987).

Greenland Mineralisation Data Bank

The first stage in the processing of data for the Greenland Mineralisation Data Bank (GREENMIN), which is planned to include information on all known economic mineral localities, has concentrated on West and North-West Greenland. In 1990 information from major mineral localities between Thule and Nanortalik was processed (Fig. 2). Processing of data from smaller or less well investigated mineral occurrences has also been completed for the area between Nuuk/Godthåb and Maniitsoq/Sukkertoppen, and is nearly complete for the Disko Bugt and Fiskenæsset areas. General background information on the establishment and aim of the data bank is found in Schønwandt (1990).

Presentation of information from the data bank in the form of tabular reports will be of two types:

(1) Summary Reports, providing a regional review of mineralisation occurrences, with selected data;
(2) Standard Reports, presenting a complete record of data available for a specific mineral occurrence.

Summary Reports list condensed extracts of data and are in two parts: one contains information on sulphide, oxide and native element occurrences, the other deals with industrial minerals, silicates and gemstones. The two parts share a common layout with each locality being described by code number, name, geographical