district (Pulvertaft, 1986) continues southwards into Nûgssuaq.

The large layered basic intrusions in Nûgssuaq are considered to have a potential for mineral deposits containing chromium and the platinum group elements. The samples from the low density stream sediment survey are being analysed for chromium, and the data may provide indications of chromite occurrences. Analyses for the platinum group elements are not made on a routine basis. However, in addition to the regional survey a number of sediment samples were collected in the small streams draining the Boye Sø anorthosite complex, and these will be analysed for the platinum group elements.

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Gravity and magnetic susceptibility survey over the northern part of the supracrustal rocks in the Disko Bugt area, central West Greenland

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As part of the Disko Bugt project (Kalsbeek, 1989) a survey of gravity and magnetic susceptibility was carried out over parts of the supracrustal rocks and the Atâ granite/tonalite (fig. 1). The objective of the survey was to acquire new geophysical data that, together with the existing regional aeromagnetic survey in the area (Thorning, 1988), can be used to study the deeper structures related to the granite and the supracrustal belts in the area.

Field work

The measurements were carried out by the author and E. Hansen, GGU. A LaCoste-Romberg gravimeter (accuracy around 0.02 mgal) on loan from the Danish Geodetic Institute, and two Scintrex SM–5 susceptibility meters were used. The work was supported by the GGU base camp at Atâ, and boat (GGU's cutter *J. F. Johnstrup*) as well as helicopter were employed. In a 10-day period at the end of July and beginning of August gravity stations were occupied along the coast at sea level. A rubber dingy from *J. F. Johnstrup* was used for transport between nearby stations, and the measurements were placed at the sea-weed mark (accepted as altitude 0 m) or as close as possible. Later, inland stations were reached by helicopter from Atâ, and at these the altitude was measured with a high-precision altimeter ('Baromec') with a proven accuracy of 0.1 mbar (approximately 80 cm in height). Stations were measured in loops returning to the base station at Atâ or to points of known height so that the pressure readings could be corrected for drift and variations due to changes in weather. At all coastal stations 8–10 measurements of magnetic susceptibility of typical rock types were taken in the immediate surroundings.

Although operating conditions were difficult, extreme care was taken during use and transport of the gravity meter in order to avoid jumps in the bias of the instrument readings. The gravity meter was kept under power and at operating temperature for the entire field

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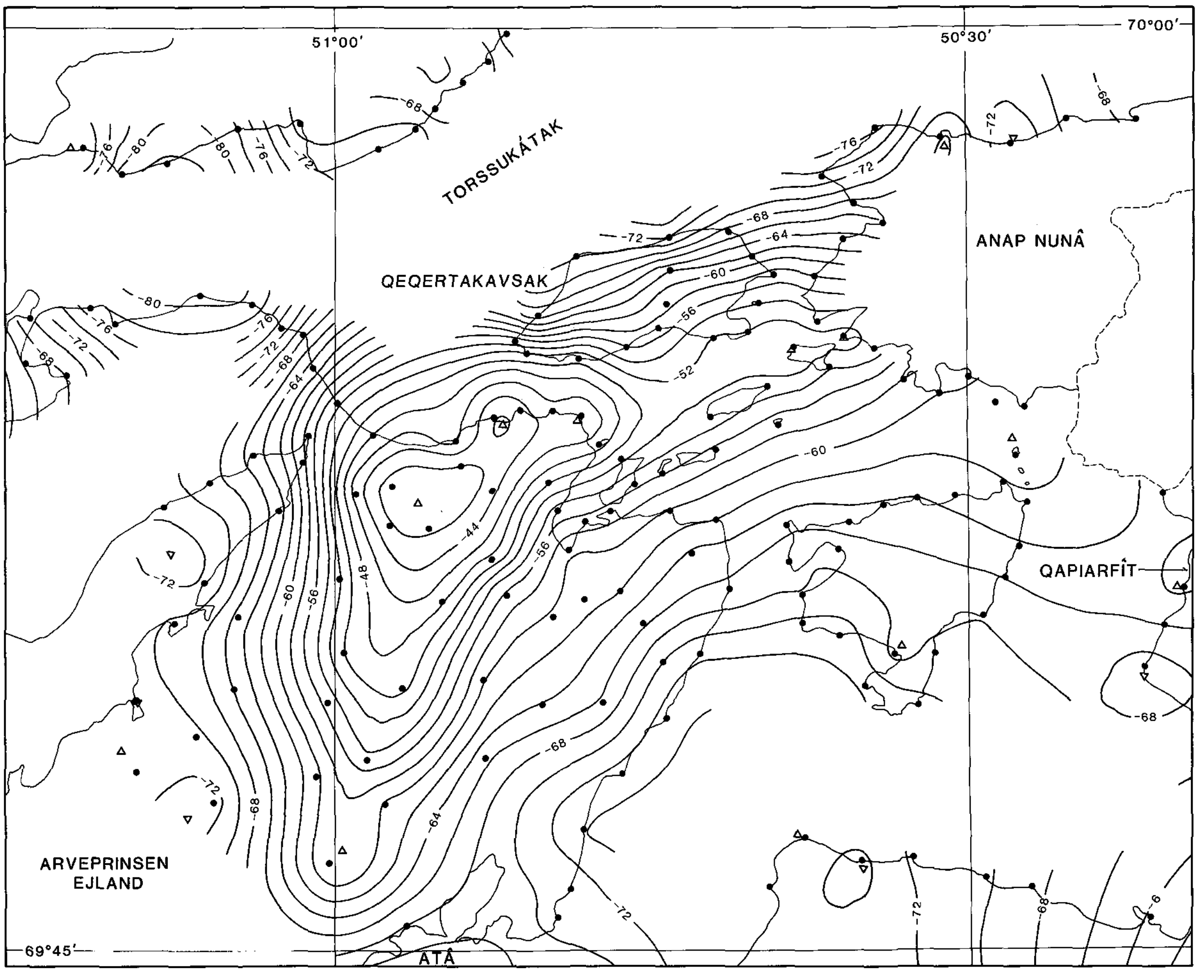

Fig. 1. Bouguer gravity anomaly map (*not* terrain corrected) based on measurement carried out in 1988. Gravity stations are indicated. Contour interval is 2 mgal. Accuracy of all stations is better than 0.5 mgal.

period. Due to logistic conditions it was not possible to return to the same base station every day, but repeat stations were used as often as possible to minimize errors from instrument drift or jumps. The measurements were tied to two absolute gravity stations in Jakobshavn, established by the Geodetic Institute at the airport and at the GTO camp.

Most of the measurements were taken in the northern part of the field area (fig. 1). A profile was also measured along the Atâ Sund coast between Kangerdluarssuk and Pâkitsoq (19 stations) and some measurements were taken in the Bredebugt/Rodebay area (17 stations).

Processing of data

In the field an HP85 computer was used for recording data and calculating uncorrected values of gravity by calibration with the measured values at the two absolute stations in Jakobshavn, thus tying the entire survey to the international gravity standardization network IGSN (Morelli, 1974). The actual height of inland stations was calculated from the corrected pressure readings following Forsberg (1986) using an average atmospheric model. In Forsberg (1986) there is an error in the formula; the correct formula (Forsberg, personal communication, 1988) is given here:

$$H_2 - H_1 = -29.21\ (T + 273)\ \ln(P_1 / P_2)$$

where H is height in metres, T temperature of the air in degrees centigrade, and P the pressure readings in millibars. The probable error is around 0.5 of a metre for coastal stations (*c.* 0.1 mgal) and 2–3 metres for inland stations (*c.* 0.5 mgal).

The final gravity values were calculated in Copenhagen at the Geodetic Institute. The processing included several steps. First the readings were corrected for the non-liniarity of the instrument using the table for the gravity meter. Secondly, the observations were corrected for earth-tides using the formula from Longman (1959) with an earth-tide factor of 1.15. Thirdly, the reduced observations were processed in a least-squares, iterative adjustment to produce simultaneous estimates of gravity values, instrument scale factors, drift rates, and possible jumps in the bias of the instrument. The method for this has been described in Forsberg (1981) and Sjøberg (1982). All measurements were processed in one operation and the result showed very good accuracy and very little drift, giving an overall error less than 0.04 mgal. Taking into account the errors from uncertainties in altitude this means that the final gravity values can be trusted to 0.5 mgal in inland areas and 0.1 mgal at coastal stations.

The positions of gravity stations were plotted on a new 1:100 000 map of the area and digitized. Positions were transformed to geocentric coordinates and used as input to the anomaly calculations together with the adjusted gravity values and height of stations. Both free-air anomalies and simple Bouguer anomalies were computed, using the Geodetic Reference System 1967 (GRS 1976) and a density of 2.67 g/cm^3 for the topography. No terrain corrections have yet been made but will be made before the final map is prepared.

The observations of magnetic susceptibility were averaged for each site. The values are not included in this report but they confirm the impression gained from the aeromagnetic survey that surface rocks are largely non-magnetic and that the sources for the aeromagnetic anomalies lie below the surface in this part of the Disko Bugt area.

A map of simple Bouguer gravity anomalies

Using the gravity observations clustered in the northern part of Disko Bugt a simple Bouguer anomaly map was produced by gridding (Thorning, 1982) into a 0.5 by 0.5 km grid. The resultant map is shown in fig. 1, which also shows the position of the individual gravity stations in the area.

From scattered older data in the area a large minimum is indicated for the northern part of Disko Bugt. The measurements presented here confirm negative Bouguer gravity values in the range −80 to −40 mgal but the areal coverage is not sufficiently good to determine the regional trend. The dominant feature in the map is a well-defined relative maximum over the northern coast of Arveprinsen Ejland, extending to the south along the spine of the island and to the north-east towards Anap nunâ, in which direction the maximum appears to run just south of the island of Qeqertakavsak and bridges the apparent structural break between this island and Arveprinsen Ejland. The maximum indicates a significant amount of excess mass here, probably related to the sill complex investigated by Schønwandt & Marshall (personal communication 1988). It means that the continuation of the structures of the north-eastern part of Arveprinsen Ejland should be sought in this direction.

In the north-western corner of the map another feature is visible on both sides of Torssukátak. However, data coverage is much too scarce in this area and the apparent correlation cannot be trusted yet.

The effect of the Atâ granite is not readily apparent on this map, but it appears to take the form of a relative minimum. The data coverage to the south is insufficient to indicate whether the contours close here, and further measurements and a regional-residual separation are necessary to isolate the anomaly related to the granite.

The map clearly indicates high priority areas for further measurements around Anap nunâ, Qapiarfît, Eqe and the land area north of Kangerdluarssuk, and the western part of Arveprinsen Ejland. When these areas have been measured it will probably be possible to make a terrain-corrected residual map which will define the structures better and allow model calculations.

Future work

The gravity measurements will be continued in 1989 as part of the Disko Bugt project to cover as a minimum the planned Atâ map sheet. In cooperation with the Geodetic Institute digital terrain models of the region are being prepared for terrain correction of the Bouguer anomalies. The sparse existing gravity data from some minor parts of the area will be examined and added to the data base. To bridge some of the worst gaps in the data coverage, additional field work is contemplated to take place at a time when the fjords are ice covered.

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Middle Proterozoic ultramafic lamprophyre dykes in the Archaean of the Atâ area, central West Greenland

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During the mapping of gneisses and supracrustal rocks around Eqe in the eastern part of the Atâ area in 1988 a series of ultramafic dykes of lamprophyric affinity were discovered by the authors. The dykes are conspicuous in the field because of their lithology, with often high contents of carbonate, and the occurrence of brownish phlogopite phenocrysts. Their ductile type of deformation and aggressive alteration of the wall-rock are distinctive. The purpose of this paper is to give a preliminary account of the mode of occurrence and lithology of the dykes based on the mapping results and a provisional inspection of a dozen thin sections. Their possible age is discussed on the basis of their spatial relation to a large NNW–SSE trending dolerite dyke dated at 1645 ± 35 Ma by Kalsbeek & Taylor (1986).

Field relations

The area around Eqe consists of migmatitic gneisses and more or less foliated granitoid rocks of Archaean age (fig. 1). To the east along the Inland Ice these give way to low to medium grade supracrustal rocks which are supposed also to be of Archaean age (Knudsen *et al.*, 1988; Kalsbeek, 1989). The ultramafic lamprophyre dykes are common throughout the Eqe area where they follow pronounced lineaments (fig. 1). Most dykes are sub-vertical and trend E–W. There is a large concentration of E–W dykes in a swarm parallel to the coast in the northern part of the area and another, less pronounced, concentration in a wider zone through the central part of the area. In addition, ultramafic lamprophyre dykes occur locally following NW–SE to NNW–SSE lineaments (fig. 1), but they are far more rare. The NW–SE dykes were often observed to be strongly magnetic in the field, but also the E–W dykes may show a more or less pronounced magnetism.

With a few exceptions, which will be described later, all ultramafic lamprophyre dykes are found only to cut the Archaean basement gneisses or amphibolite layers within them. At one locality, in the central part of the area shown in fig. 1, a dyke has been observed to continue from the gneisses and amphibolites into the supracrustal rocks. Elsewhere the dykes appear to stop at the boundary to the latter. There is no obvious reason for this, since the ultramafic lamprophyre dykes seem to be much younger than the supracrustal rocks and the E–W lineaments associated with the dykes continue into the supracrustal rocks from the gneisses. A possible explanation for this discrepancy could be that the thin ultramafic lamprophyre dykes are difficult to detect in the mostly darker and more crumbled supracrustal rocks, which additionally often have a more extensive Quaternary cover.

Individual dykes commonly range from a few centimetres to 1–2 m in thickness, but some dykes may be as much as 4–5 m thick. The dykes have a straight course and cut right through earlier structures within the gneisses. Nevertheless, they often show strong internal deformation including tight, ductile, small-scale folding and shearing (fig. 2). The country rock immediately

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