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Supracrustals of pre-Ketilidian age (the Tartoq Group) and their relationships with Ketilidian supracrustals in the Ivigtut region, South-West Greenland

by

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SUPRACRUSTALS OF PRE-KETILIDIAN AGE (THE TARTOQ GROUP) AND THEIR RELATIONSHIPS WITH KETILIDIAN SUPRACRUSTALS IN THE IVIGTUT REGION, SOUTH-WEST GREENLAND

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Abstract

The development of research in the Ivigtut region leading to the establishment of a pre-Ketilidian supracrustal sequence is briefly outlined. The stratigraphy of the Ketilidian supracrustals, the nature of the pre-Ketilidian supracrustals and the unconformable relationship of the two sequences are described. The older supracrustals, the Tartoq Group, are shown to have suffered deformation, metamorphism and migmatisation in pre-Ketilidian time.

CONTENTS

I INTRODUCTION

Systematic mapping has been carried out in the Ivigtut region (fig. 1) by the Geological Survey of Greenland (Grønlands Geologiske Undersøgelse = GGU) for the past decade. In the course of the work a chronological interpretation was developed based on several key areas, and was adopted throughout the region by the team of geologists working under the leadership of A. Berthelsen (Berthelsen, 1960).

Because of a lack of maps the easternmost part of the Ivigtut region along the inland ice - the Grænseland area - was not mapped until 1960, when A. Berthelsen and E. Bondesen began to work in the area in order to complete the mapping of the region for the 1:100,000 map (the Ivigtut sheet, 61°00' to 61°30' N). These investigations necessitiated some modifications of the original interpretation. In 1964 A. K. Higgins began work in the Midternæs area on the neighbouring sheet to the north (the Neria sheet, 61°30' to 62°00' N). This work confirmed the results from the Grænseland area, and it also became clear that revision of the chronology was necessary.

II DEVELOPMENT OF RESEARCH

In his classic paper Wegmann (1938) summed up the history of geological investigations in South Greenland from K. L. Giesecke's explorations in the years 1806-13 to his own day. In revising Ussing's (1912) classification Wegmann distinguished two Precambrian periods which he termed the Gardar and the Ketilidian. He divided the Ketilidian succession into the Sermilik Group, consisting of sedimentary rocks, and an overlying Arsuk Group comprising volcanic rocks. The type localities of these two groups were respectively between the fjords Syd Sermilik and Tasermiut in the Nanortalik region, and on Arsuk Ø.

Wegmann proposed that most of the migmatitic rocks of the Ivigtut region represented equivalents of the Sermilik Group. However, he had already recognised the possibility, worked out more fully in subsequent papers (1939, 1948), that the contact between the sediments and volcanics of the

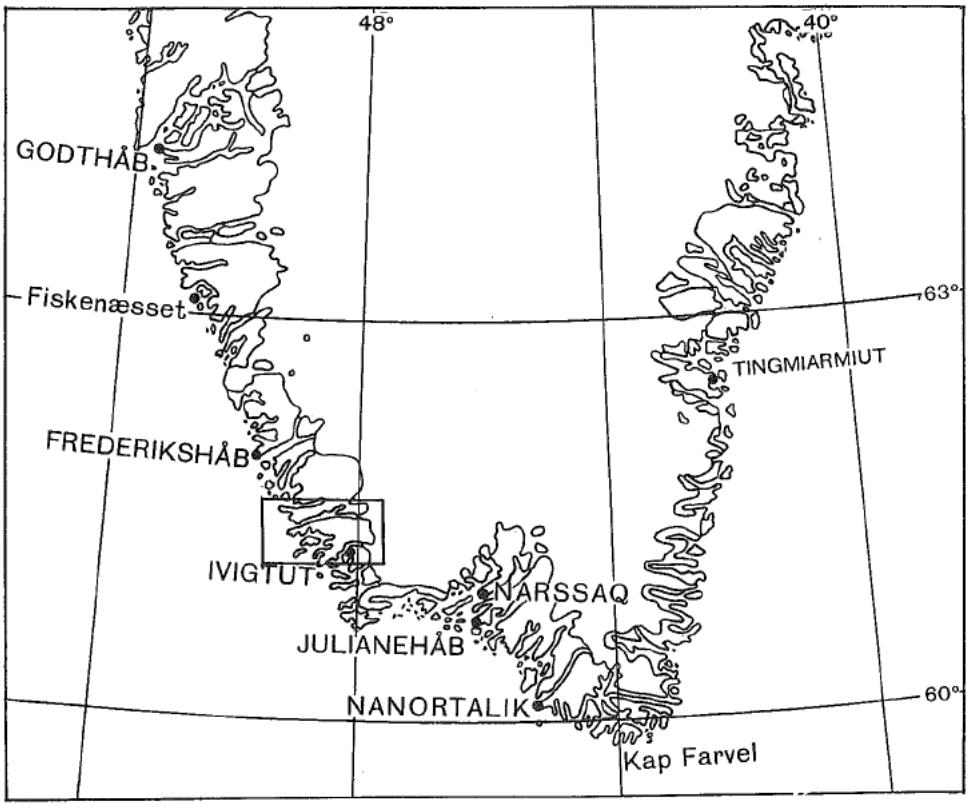


Fig. 1. Map of South Greenland showing the position of the Ivigtut area.

superstructure and the migmatitic gneisses of the infrastructure might, in fact, correspond to an old erosion surface, and thus, that the gneisses of the Ivigtut region were pre-Ketilidian in age.

In 1954 and 1955 GGU carried out reconnaissance work in the Ivigtut region, and systematic mapping was begun in 1956. Of great importance in the new work was the establishment of the relationships between the gneisses and migmatites of the infrastructure and the supracrustal rocks of the Arsuk and Sermilik Groups - the superstructure -, and the structural history of both infrastructure and superstructure.

In addition to the already known occurrences of supracrustal rocks in the Arsuk region and in Kobberminebugt, belts were discovered in Qôrnoq fjord, and along the border of the inland ice on both sides of the Arsuk glacier. Most of these occurrences consist of sediments with quartzites and

dolomites, overlain by volcanics, relationships which correspond closely to those found in the Arsuk Ø area. Other new occurrences of supracrustal rocks, of particular significance with respect to this paper, were those of the Tartoq area, several broad areas on both sides of Sermiligârssuk fjord, and Midternæs.

As mapping progressed it appeared that the infrastructure showed a general conformity to the superstructure, and the deformational chronology of the two structural levels also appeared to coincide. The general synthesis emerged that the whole Ivigtut region consisted of a culminating migmatitic and metamorphosed infrastructure surrounded and partially covered by a metamorphosed but non-migmatitic superstructure (Berthelsen, 1960). Berthelsen suggested that most of the infrastructure was derived from Ketilidian material. He considered that pre-Ketilidian rocks could only be inferred from the existence of pebbles of granite, gneiss and crystalline schist in the lower part of the Ketilidian succession, although reworked pre-Ketilidian rocks might also occur within the Ketilidian fold belt (Berthelsen, 1961). Migmatitic relationships between infrastructure and superstructure were described from the Tartoq area (Berthelsen, 1960, p. 153), an area south of Sermiligârssuk fjord (Ayrton, 1963) and an area to the south of Sioralik fjord (Weidmann, 1964). In the southern part of the region migmatisation was associated with augen gneisses and the emplacement of Ketilidian granites.

The post-migmatisation development in the region was characterised by the intrusion of basic dykes (Kuanitic dykes), together with their metamorphism and deformation, and reactivation and granitisation (Sanerutian). The chronological interpretation of the development of the Ivigtut region as put forward by Berthelsen and others was as shown in table 1.

The following authors have employed the chronology of table 1 and based their work on its implications: Ayrton (1963), Berthelsen (1960, 1961, 1962), Berthelsen, Bondesen and Jensen (1962), Bondesen (1962), Bondesen and Henriksen (1965), Henriksen (1960), Oen Ing Soen (1962) and Weidmann (1964). In many of the papers local applications of the general chronology are included. The scheme has also had some influence on the work in the Julianehåb area, for which readers are referred to Allaart (1964).

The detailed mapping of the Grænseland area (termed the Eastern belt by Berthelsen in 1960) was begun in 1960 and resulted in the discovery of an unconformity between supracrustals, correlatable with the Ketilidian

TABLE I

Chronological scheme for the Ivigtut region according to Berthelsen (1960, 1961) and others.

GARDAR	Intrusion of plutonic complexes, dyking and faulting
.....	
SANERUTIAN	Faulting Reactivation, granitisation, intrusion of plutonic complexes and deformation in the southern part of the region Regional metamorphism decreasing in intensity northwards
KUANITIC	Swarms of basic dykes
.....	
KETILIDIAN	Faulting Folding, metamorphism, migmatisation and the emplacement of augen gneiss and granites Volcanics of the Arsuk Group Sediments of the Sermilik Group
.....	

supracrustals of the Arsuk Ø area, and the underlying gneisses. The gneisses below the unconformity in Grænseland were therefore considered to be of pre-Ketilidian age. In view of the more complete and better preserved supracrustal succession in Grænseland, this area was chosen as the type area and the stratigraphy of the Ketilidian rocks was redefined as comprising a lower sedimentary group, the Vallen Group, and an upper volcanic group, the Sortis Group. The sub-divisions of these groups were presented by Berthelsen and Noe-Nygaard (1965) and Bondesen (1962 and in prep.).

Berthelsen suggested that the pre-Ketilidian gneisses beneath the unconformity in Grænseland were mainly restricted to an upthrust wedge (Berthelsen and Noe-Nygaard, 1965), and that most of the Ivigtut gneisses

represented transformed parts of the Ketilidian succession as in his earlier interpretation (Berthelsen, 1960).

Bondesen proposed in 1962 that most of the gneisses of the Ivigtut region represented pre-Ketilidian rocks, and that the border with the supracrustals had, especially in the southern part of the region, been modified by deformation and remobilisation. This view was mainly based on observations which questioned the chronological position of the Kuanitic dykes, as some of them seemed to be deformed by the same structures which deformed the Ketilidian. These views influenced the interpretations of Allaart (1964) and Bridgwater (1965).

The Midternæs area became the object of mapping in 1964, and the same Ketilidian succession as found in Grænseland was encountered, including the unconformity at the base of the Ketilidian. In 1965 Ketilidian supracrustal rocks were found to overlie unconformably parts of the Tartoq-Sermiligârssuk belt of supracrustal rocks.

It thus became evident that two supracrustal successions of different ages existed, each with its own stratigraphical, structural and metamorphic history. This meant that the migmatitic border relations between the Tartoq -Sermiligârssuk belt of supracrustals and the infracrustals (Berthelsen, 1960, Ayrton, 1963, Weidmann, 1964) represented the activity, not of the Ketilidian orogeny, but of an older orogenic period. It also demonstrated that the girdle of supposedly contemporaneous supracrustals surrounding the Ivigtut region (Berthelsen, 1960) did not exist in the form imagined.

In the following pages the stratigraphy of the Ketilidian supracrustals is outlined, their unconformable relationship with the older supracrustals is described, and the nature and known extent of the older supracrustal sequence is set out.

III STRATIGRAPHY OF THE KETILIDIAN SUPRACRUSTALS

The unconformity at the base of the Ketilidian established in Grænseland can be traced northwards into Midternæs (fig. 2). North of Midternæs the trace of the unconformity swings towards the east where it is concealed by the Sermiligârssuk glacier, and it outcrops again in north -east Midternæs. The plane of unconformity and the bedding planes of the Ketilidian sediments are inclined generally eastwards. Ketilidian supracrustals have not been proved to exist north of Sermiligârssuk.

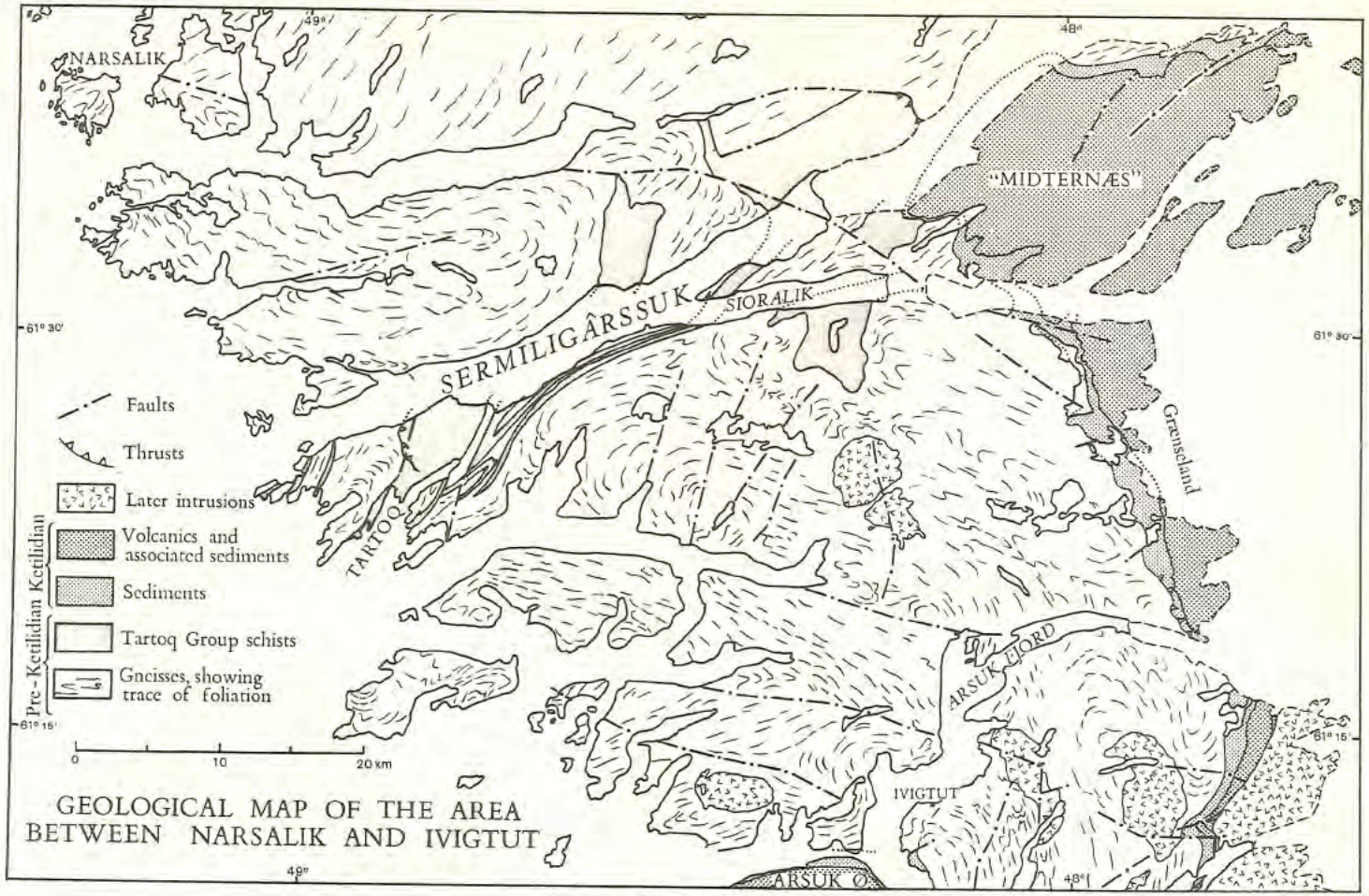
The details of the Ketilidian stratigraphy are best known in central and north Grænseland (Bondesen, 1962, and in prep.) and in Midternæs where the unconformity is autochthonous, or is modified locally by only minor movements. J. Muller (personal communication) has also outlined a detailed stratigraphy for the Ketilidian supracrustals of the Arsuk Ø area comparable to the type succession in Grænseland. The stratigraphy is outlined in table 2. In south Grænseland and in areas to the south the supracrustal-infracrustal border is affected by thrusting and parts of the succession are missing. The grade of metamorphism of the supracrustals increases progressively southwards, but in north Grænseland and Midternæs it is very low greenschist facies (Windley et al., in press).

TABLE 2

Ketilidian stratigraphy

QIPISARQO GROUP	Sediments and volcanics, with a thick polymict conglomerate at the base	
SORTIS GROUP	Rendesten Formation	- Pyroclastics, semi-pelites, greywackes and thick intrusive sills
	Foselv Formation	- Pillow lavas and intrusive sills
VALLEN GROUP	Grænsesø Formation	- Graphitic pelites, cherts, dolomite and dolomitic quartzites
	Blåis Formation	- Graded greywackes, semi-pelites, pelites and "wildflysch"
	Zig Zag Land Formation	- Conglomerates, shales, quartzites, arkoses and dolomites

In central and north Grænseland and Midternæs sediments of the Vallen Group immediately overlie the unconformity. The earliest sediments appear to have been laid down in local shallow basins on a roughly peneplained gneiss surface. It is possible to distinguish three initially separate depositional basins between central Grænseland and Midternæs (fig. 3).



GEOLOGICAL MAP OF THE AREA BETWEEN NARSALIK AND IVIGTUT

Fig. 2.

In central Grænseland thin beds of arkose and badly sorted conglomerates were deposited locally in the southernmost of the three basins distinguished. The conglomerate pebbles are mainly of gneiss derived by erosion from the infracrustals, but some quartzite, dolomite and amphibolite pebbles also occur. These deposits are overlain by dolomites, whose deposition apparently was accompanied by a deep carbonatisation of the sub-Ketilidian gneiss surface. This carbonatisation is restricted to the southern basin. Above the dolomites occur thin varved shales, a magnetite-bearing conglomerate, and a banded quartzite sequence up to 110 m thick.

In north Grænseland and in Midternæs south of lake 25 the base of the Vallen Group comprises a quartzite sequence up to 150 m thick which was laid down in the central of the three sedimentary basins. The quartzites thin towards the northern and southern limits of the basin, and towards the southern limit higher stratigraphic levels of the Vallen Group rest directly on the sub-Ketilidian surface and clearly represent the deposits successively laid down in a transgressive sedimentary basin. A variety of sedimentary structures, ripple marks, current-bedding and slumps, may be seen in the quartzites.

North of lake 25 in Midternæs a basal conglomerate up to 4 m thick, containing quartzitic and gneissic pebbles, occurs at the base of the Vallen Group, and is overlain by about 30 m of conspicuously graded-bedded sandstones. Both units thin towards lake 25 and are thought to have been laid down in the southern part of a third sedimentary basin.

The boundaries between the three basins were probably minor topographical features on the sub-Ketilidian surface. The shape and trend of these features is uncertain, but it is possible that they were in part eroded fault scarps. Major faulting occurred along the boundary between the southern and central basins in the course of Vallen Group sedimentation, and led to the formation of a "wildflysch" in the southern basin.

During deposition of the lower Vallen Group the sedimentary basins were shallow, and the occurrence of sun-cracks suggests they were locally dry. During mid-Vallen group time there appears to have been a regional deepening of the Ketilidian sea which led to transgression of the shallow ridges between the basins and their eventual submergence.

Throughout Grænseland and Midternæs mid-Vallen Group sediments comprise a thick succession of banded greywackes, semi-pelitic and pelitic shales, and occasional beds of quartzite, dolomite and arkose (the Blåis

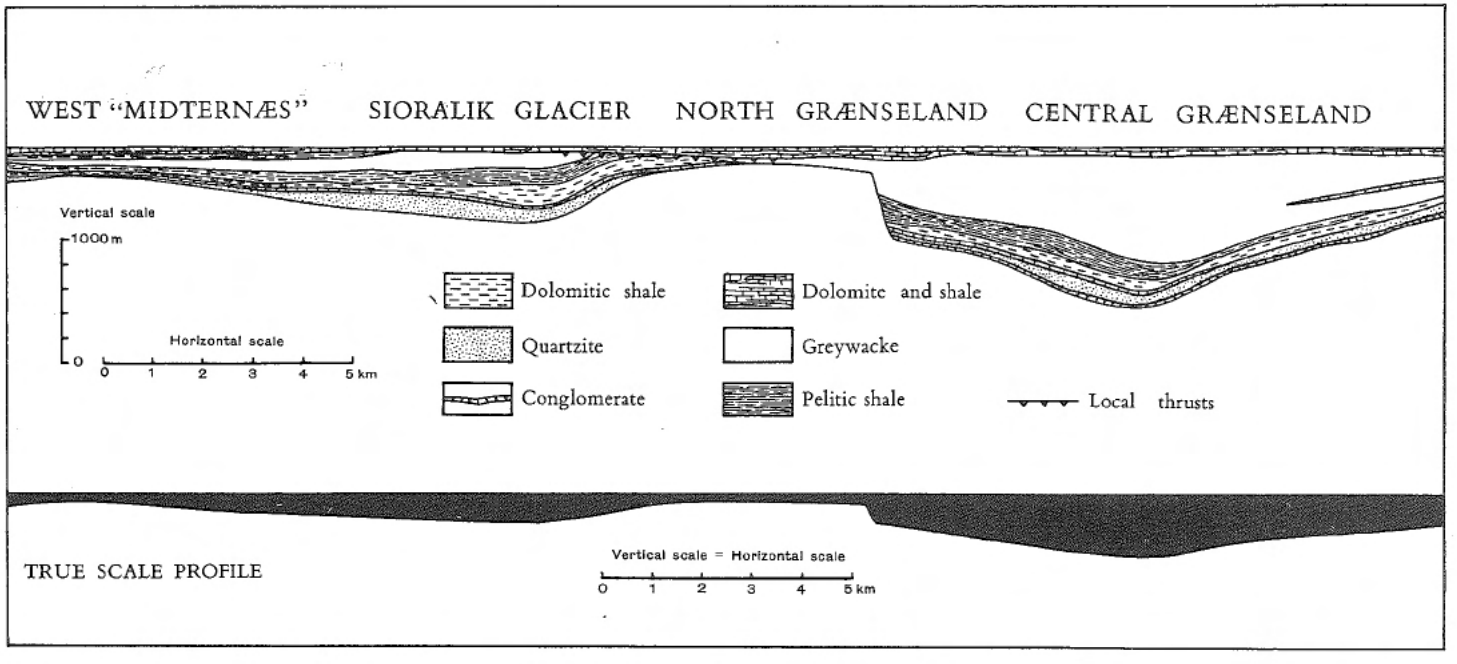


Fig. 3. Schematic profiles from West Midternæs to Central Grænseland to show the basin development of the Vallen Group.

Formation). These deposits are about 100 m thick in west Midternæs and increase to about 700 m in thickness in central Grænseland.

The upper Vallen Group (the Grænsesø Formation) comprises pelitic shales, cherts, dolomitic quartzites and dolomites, all carbon rich, and has a fairly consistent thickness of 60 to 100 m throughout the region. A thin dolomite band observed at two localities in Grænseland and one in Midternæs was found to contain numerous spherical organic structures which have been named Vallenia (Bondesen, Pedersen and Jørgensen, in prep.).

The sedimentary variations of the Vallen Group are summarised in the schematic cross-section of fig. 3.

The Vallen Group is overlain everywhere by the Sortis Group. The Sortis Group consists of a very thick sequence (up to 4000 m) of pillow lavas, pyroclastics and sediments (pelites, semi-pelites, greywackes, dolomites and a thin coal) which has been intruded at all levels by thick sills of intermediate to basic composition.

The Sortis Group lavas are characterised by pillow structures up to 10 m in length and moulded upon each other in the classical manner. Lava extrusion appears to have been almost entirely subaqueous.

To the south of Grænseland a thick unit of metamorphosed sediments and volcanics, the Qipisarqo Group, which begins with a thick polymict conglomerate, overlies the Sortis Group (Berthelsen and Noe-Nygaard, 1965).

Two main phases of folding deform the Ketilidian rocks: an early tight to isoclinal folding with generally flat-lying axial planes, and a later more open folding with NE-striking steeply inclined axial planes. The early folding is only clearly developed in the sediments of the Vallen Group, and is apparently mainly represented by low angle thrusts in the generally more massive rocks of the Sortis Group. Thrusting related to the early folds appears to become more important southwards. Major and minor folds of the later NE phase occur throughout Midternæs and Grænseland in the Vallen and Sortis Groups, and deform the unconformity in west Midternæs (fig. 4).

IV THE SUB-KETILIDIAN SURFACE

Along a stretch from central Grænseland to Midternæs the basal Ketilidian sediments rest directly on a roughly peneplained surface of pre-Ketilidian rocks. In some areas original minor irregularities on the surface

have been filled in by basal Ketilidian conglomerate or quartzite deposits. The conglomerates contain pebbles derived from erosion of the pre-Ketilidian rocks, and some of the conglomerates may represent residual gravels. Minor topographical features of the sub-Ketilidian surface appear to have influenced the early sedimentation of the Vallen Group which was initially limited to shallow basins.

In Grænseland the pre-Ketilidian rocks consist of homogeneous nebulitic quartzo-feldspathic gneisses, biotite gneisses and amphibolites. The foliation planes of these rocks are transected by the unconformity at angles up to 60°.

The gneisses in Midternæs vary from rather homogeneous quartz gneiss, to strongly banded biotite and hornblende gneisses. In some areas the banding is cut almost at right-angles by the plane of unconformity.

North of the lake 25 in west Midternæs the sub-Ketilidian surface is formed by a broad zone of steeply inclined hornblende-chlorite schists. These schists are unconformably overlain by Vallen Group sediments dipping at moderate angles generally north-eastwards. A conglomerate at the base of the Vallen Group fills in minor irregularities in the undulating schist surface. These schists are clearly older than the Ketilidian supracrustal rocks, and form part of a distinct supracrustal succession exposed in the Tartoq-Sermiligârssuk area.

It is proposed that all the pre-Ketilidian supracrustal rocks in the Tartoq-Sermiligârssuk-Midternæs area, which will be shown below to comprise comparable sedimentary-volcanic sequences, be entitled collectively the TARTOQ GROUP.

V THE TARTOQ GROUP IN MIDTERNÆS

The Tartoq Group, in that part of the type area where its age is demonstrable, the easternmost of the two occurrences in Midternæs, outcrops in a 3 km broad zone bounded to the north-west and south-east by gneisses (fig. 4). The Ketilidian unconformity and the Sermiligârssuk glacier limit the band to the north-east, and to the south-west it is transected by a major NW striking sinistral fault. In contrast to the neighbouring Ketilidian rocks, the Tartoq Group is relatively highly metamorphosed and exhibits a poorly defined stratigraphy.

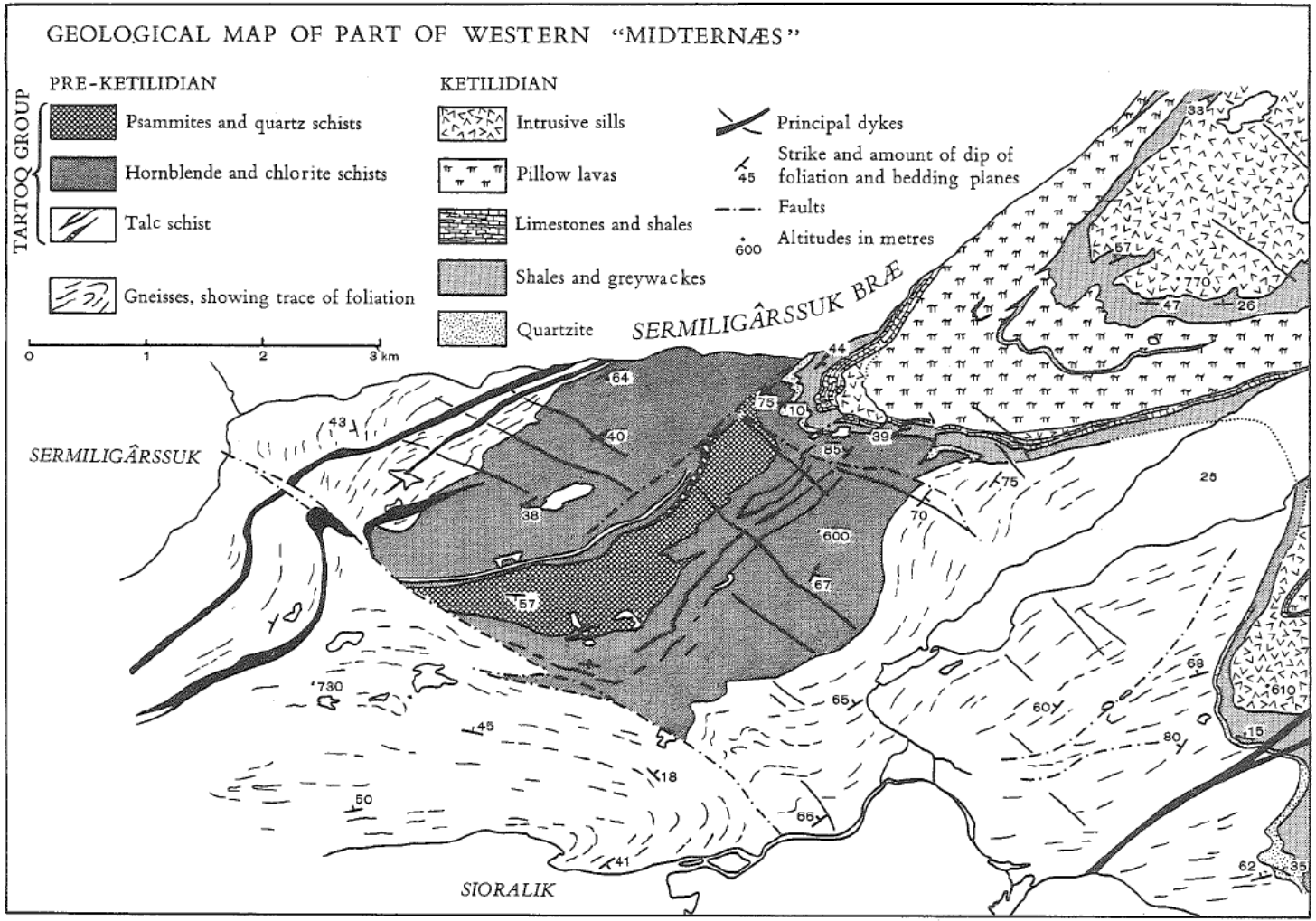

GEOLOGICAL MAP OF PART OF WESTERN "MIDTERNÆS"
PRE-KETILIDIAN
TARTOQ GROUP
Psammites and quartz schists
Hornblende and chlorite schists
Talc schist
Gneisses, showing trace of foliation
KETILIDIAN
Intrusive sills
Pillow lavas
Limestones and shales
Shales and greywackes
Quartzite
Principal dykes
Strike and amount of dip of foliation and bedding planes
Faults
Altitudes in metres
0 1 2 3 km
SERMILIGÂRSSUK BRÆ
SERMILIGÂRSSUK
SIORALIK

Fig. 4.

The zone of schists is mainly composed of a variable group of hornblende-chlorite schists. Many of these rocks are finely banded, with alternating bands of quartz schist and hornblende or chlorite schist; the banding is probably relic sedimentary bedding. The main lithological divisions of the band of schists are shown in fig. 4.

Parts of the hornblende-chlorite schists are compact dark green-grey rocks with a poorly developed foliation and an uneven surface weathering. The occurrence of occasional pillow structures, much modified by deformation but still recognizable, suggests that at least some of these rocks originated as submarine lavas.

A few massive bodies of amphibolite occur as lenses in the schists. They are coarse-grained rocks, sometimes pure amphibolite and sometimes intergrowths of hornblende, feldspar and mica. The microscopic texture of some of these rocks suggests they may have had an igneous origin, perhaps as basic sills.

At one locality in the northern part of the band, a 20 m wide band of agglomerate or conglomerate was found interbedded with the schists.

Bands of talc-rich schist, from 5 to 60 m wide and often traceable for several kilometres, occur interbedded with the hornblende-chlorite schists. Four main bands can be distinguished. Some of the bands contain abundant pyrite and carbonate minerals commonly occur in thin veins or ovoid lenses. It is thought that the talc schists are the metamorphosed representatives of Mg-rich calcareous sediments.

A broad psammite band divides the schist zone into two roughly equal parts. Parts of this band are of somewhat gneissic character, but the band is concordantly interbedded with the schists and preserves in places a regular rhythmic banding, and it seems likely that it was originally a banded quartzite and an integral unit of the stratigraphy of the Tartoq Group.

The north-west border of the broad schist zone has a gradational contact with the adjacent infracrustal gneisses. The transition from schist to gneiss takes place over a distance of about 50 m perpendicular to the strike, an increasing proportion of gneissic bands, usually intercalated concordantly with the schists, being encountered as the gneisses are approached. The schist-gneiss border is regarded as a migmatitic feature. Bands and lenses of schistose rocks encountered within the adjacent gneisses suggest that some of them represent transformed parts of the Tartoq Group.

The Tartoq Group in Midternæs appears to comprise the metamorphosed equivalents of an original sequence of sedimentary and volcanic rocks with some intrusions of sill-like basic bodies. However, it is not at present justifiable to erect even a partial stratigraphical succession on account of tectonic complications. There is evidence for several phases of pre-Ketilidian folding in the schists of the Tartoq Group of which at least one was isoclinal. In addition the superimposition of the two main Ketilidian fold phases locally has some importance.

VI THE TARTOQ GROUP IN THE TARTOQ-SERMILIGÅRSSUK AREA

In the Tartoq area and on both sides of Sermiligârssuk fjord there occur several broad areas of supracrustal rocks. These supracrustals were formerly considered to be of Ketilidian age and formed the "Tartoq belt" of Berthelsen (1960). However, they are in part continuations along the strike of the pre-Ketilidian supracrustals of Midternæs and are very similar to them in their lithological characters and metamorphic condition. The main areas are briefly described below.

Weidmann (1964) has described an area of supracrustals to the south of Sioralik fjord which comprises basic schists, probably derived from pillow lavas and gabbros, "zones rouillées" perhaps formed by the metamorphism of pyritic shales, pelitic schists, calcareous schists and quartzo-feldspathic schists.

Some narrow zones of supracrustals along the south margin of Sermiligârssuk fjord have been described by Ayrton (1963). They mainly consist of basic schists which Ayrton considers were derived from basic igneous rocks. Beds of quartzo-feldspathic schists were probably formed from quartzitic or arkosic sandstones. Pelitic schists and talc schists also occur.

In the Tartoq area several narrow zones and one broad zone of supracrustal rocks are found. The dominant rocks are basic hornblende schists in which relic pillow structures may be observed; a large proportion of these schists have evidently been formed by the alteration of original submarine pillow lavas. Calcareous bands and quartz schist bands also occur (Jacobsen, 1961).

Two broad areas of supracrustals occur on the north side of Semiligârssuk fjord. The western area is composed mainly of amphibole -chlorite schists, derived probably from basic volcanics, and also includes bands of rust coloured pyrite-quartz-chlorite schists, black talc hornblendite and light homogeneous talc schist (Micheelsen, 1955; N. Henriksen, personal communication). The eastern area comprises mainly chloritic schists. Lenses and bands of talc schist, serpentinites, hornblendites and an agglomerate-like rock have also been reported (N. Kelstrup, personal communication).

The supracrustals south of Sioralik fjord mapped by Weidmann are probably a direct continuation of the broad schist zone on Midternæs displaced sinistrally by a major NW fault (fig. 2).

The zones mapped by Ayrton continue eastwards to cross the western extremity of Midternæs as a narrow zone about 1.5 km wide. This same zone is possibly found again on the north side of Sermiligârssuk fjord just south-west of the major NW fault and, if so, is probably partly equivalent to the broad supracrustal area north-east of the fault.

The schists of the Tartoq area and those of the western area north of Sermiligârssuk may be partly equivalent.

All the supracrustal areas in the Tartoq-Sermiligârssuk-Midternæs area exhibit similar lithological variations and it is most probable that they were originally part of a single succession of volcanic and sedimentary rocks - the Tartoq Group. The successions in each area are too incompletely known, partly because of structural complexities, to permit correlations of individual horizons or units between the different areas.

The Tartoq Group supracrustals have been metamorphosed mainly under epidote-amphibolite facies conditions. In Midternæs they contrast markedly with the almost non-metamorphic Ketilidian rocks, and it is evident that they have been affected by at least one pre-Ketilidian metamorphic episode.

The structural history of the Tartoq Group supracrustal areas is imperfectly known but they appear to have been affected by several pre-Ketilidian phases of deformation. The present disposition of the areas of Tartoq Group schists in synclinal or fault-bounded zones would appear to be the result of one such deformational phase.

The border relations of the Tartoq Group supracrustals and adjacent infracrustal gneisses are described by Windley et al. (in press) as principally migmatitic in nature, and some of the infracrustal gneisses are

believed to be transformed representatives of parts of the Tartoq Group. These migmatised gneisses are overlain unconformably by Ketilidian rocks and the migmatisation is thus a pre-Ketilidian event.

It is uncertain what proportion of the infracrustal gneisses exposed to the north and south of Sermiligârssuk fjord were derived from representatives of the Tartoq Group, or from higher or lower stratigraphical sequences in the same succession. If it could be demonstrated that the relic stratigraphy of the Ivigtut gneisses was continuous with that of the Tartoq Group, then the structural history of the Ivigtut region as summarised by Berthelsen (1960) might, in a modified form, correspond to the pre-Ketilidian deformations apparent in the supracrustals of the Tartoq Group. The same may be said of the local structural descriptions of Ayrton (1963) and Weidmann (1964).

It is, however, possible that only a narrow zone of gneisses surrounding the areas of Tartoq Group supracrustals was derived directly from them. The Ivigtut gneisses and the gneisses north of Sermiligârssuk might mainly represent the basement upon which the Tartoq Group was laid down. In this event the basement might be expected to preserve traces of a complex pre-Tartoq Group history in addition to the influence of the phases of deformation, metamorphism and migmatisation which affect the Tartoq Group.

As the Tartoq Group includes volcanic rocks (pillow lavas) and sediments of possible geosynclinal type it might be postulated that they represent the depositional phase of a pre-Ketilidian geological cycle and that the subsequent mobilisation represents the orogenic phase of that cycle. Evidence for such genetic relationships is, however, circumstantial in view of our, at present, limited knowledge of the pre-Ketilidian.

A revised chronological scheme for the Ivigtut region is presented in table 3.

Of the chronological possibilities for the Ivigtut area discussed by Allaart (1964), the interpretation "Ivigtut A" is closest to the sequence of events now known.

Further aspects of pre-Ketilidian chronology are discussed and a supracrustal sequence of possible similar age to those of the Tartoq Group is described in Windley et al. (in press).

TABLE 3

Revised chronological scheme for the Ivigtut region.

KETILIDIAN	Faulting
	Folding, metamorphism, migmatisation and the emplacement of augen gneiss and granites
	Deposits of the Qipisarqo Group
	Volcanics of the Sortis Group
	Sediments of the Vallen Group
.....	Unconformity
	? Basic dykes
PRE-KETILIDIAN	Folding, metamorphism and migmatisation
	Tartoq Group - sediments and volcanics
	? Older basement - parts of Ivigtut gneisses
.....	

VII SUMMARY

Supracrustals of pre-Ketilidian age occurring in the Tartoq-Sermiligârssuk-Midternæs area are distinguished and described under the collective name of the Tartoq Group.

The Tartoq Group comprises the metamorphosed equivalents of an original sequence of sedimentary and volcanic rocks whose former limits have been obscured by pre-Ketilidian phases of deformation, metamorphism and migmatisation.

The infracrustal gneisses which border the Tartoq Group appear to represent in part migmatised derivatives of the Tartoq Group, but may also include transformed rocks of earlier age.

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