GRØNLANDS GEOLOGISKE UNDERSØGELSE
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The Geological Survey of Greenland
Report No. 107

Lithostratigraphic framework of the Upper Proterozoic and Lower Palaeozoic deep water clastic deposits of North Greenland

by

J. D. Friderichsen, A. K. Higgins, J. M. Hurst,
S. A. S. Pedersen, N. J. Soper and F. Surlyk

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Abstract

The deep water clastic and subordinate carbonate sediments of the Franklinian Basin of North Greenland are assigned to 6 lithostratigraphic groups. The lowest, Skagen Group (new), consists of structureless quartzitic sandstones and phyllitic mudstones of ?late Precambrian to Cambrian age. The following Paradisfjeld Group (revised) is dominated by lime mudstones and is probably of Cambrian age. Redeposited limestone conglomerates characterise the top parts of the group. The subsequent Polkorridoren Group (revised) consists of thick sandstone turbidite and mudstone units of Cambrian age. The overlying Vølvedal Group (new) consists of cherts, mudstones, turbiditic sandstones and resedimented chert and carbonate conglomerates and is of Cambrian to earliest Ordovician age. The following Amundsen Land Group (new) is dominated by cherts and mudstones with resedimented limestone conglomerates, and is of early Ordovician to early Silurian age. The youngest, Peary Land Group, is dominated by turbiditic sandstones and mudstones and ranges in age from earliest Silurian to possibly earliest Devonian. The 'Sydgletscher Group' is disbanded: the component parts are placed in the Polkorridoren Group, Vølvedal Group, Amundsen Land Group and Peary Land Group.

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Brown Series		3b Calcareous and graphitic slates (Lower Sydgletscher shales)			Vølvedal Group
Frigg Fjord Mudstones		3a Purple and green mudstones (Nysne Gletscher mudstones)		Formation C	Polkorridoren Group
Polkorridoren Series Grønnemark Sandstones and Shales	Polkorridoren Group	2b Arkosic psammite (Polkorridoren psammite) 2a Rusty, green quartz phyllite			
Malcantone Gletscher Marbles and Slates; Paradisfjeld Marbles and Phyllites; Nordgletscher Marbles; Ulvebakkerne Marbles	Paradisfjeld Group	1d Yellow limestones 1c Green calcareous phyllite 1b Dark gray limestone 1a Graphitic and calcareous phyllites		Formation B	Paradisfjeld Group
				Formation A ? Hundeskrænten carbonates and clastics	
					Skagen Group

Fig. 1. Some previous lithostratigraphic schemes covering the deep water sediments of North Greenland. Note that 'formation B' of Dawes & Soper (1979) corresponds to the Amundsen Land Group of this article. However, Dawes & Soper (1979) also considered 'formation C' to approximate to the Polkorridoren Group of Dawes & Soper (1973) as well as the un-named Silurian formations of Christie & Peel (1977). This correlation cannot be clearly depicted on one figure.

INTRODUCTION

The Upper Proterozoic and Lower Palaeozoic deep-water sediments of North Greenland and northern Ellesmere Island, Canada, were deposited in the Franklinian Basin (Trettin & Balkwill, 1979). The deep-water facies of North Greenland are predominantly clastic and up to 8 km thick. The Upper Proterozoic – Ordovician part of the sequence outcrops mainly in a broad zone along the north coast of Greenland, within the present North Greenland fold belt, of which the eastern half is shown in Plate 1. In the Silurian the deep-water flysch basin expanded southwards for considerable distances, and areas as far south as Kronprins Christian Land can be envisaged to have formed part of the enlarged Franklinian Basin (fig. 8).

A full discussion of previous geological work in the clastic facies, and North Greenland in general, has been given by Dawes (1971, 1976) and Dawes & Soper (1973, 1979). This article is prompted by the need to rationalise the numerous stratigraphic terms which have been formally and informally applied to some of the sediments. In particular, the lithostratigraphies erected north (Dawes & Soper, 1973) and south (Dawes & Soper, 1979) of the Harder Fjord fault zone (fig. 1) can now be integrated (Hurst & Surlyk, 1980; Surlyk, Hurst & Bjerreskov, 1980). The whole sequence is divisible into lithostratigraphic units of mainly formational rank, the descriptions of which are in preparation. The present paper is limited to the formal definition (and redefinition) of lithostratigraphic units on group level. Distribution of the groups is shown on Plate 1 and fig. 8. Consequently, a basic comprehensive lithostratigraphic nomenclature is provided to cover the whole deep-water clastic sequence of North Greenland.

LITHOSTRATIGRAPHY

Definition of the groups starts with the oldest sediments and finishes with the youngest.

Skagen Group

new group

History. This is the lowest group recognised in the North Greenland part of the Franklinian Basin (fig. 1). It corresponds to the 'Unnamed quartzite group' of Soper *et al.* (1980) and Higgins *et al.* (1981). Rocks referred to this group were observed by J. P. Koch (1916) who reported the area around Skagen to consist of "steel-grey granite" (p. 344); these are structureless quartzitic sandstones. Brief mention is also made by Christie & Ineson (1979, p. 65) in their description of a "third sedimentary sequence, north-east of Depotbugt". White quartzites, cut by dolerite intrusions, south of Depotbugt (Dawes, 1976, p. 277; Dawes & Soper, 1979, p. 10; Christie & Ineson, 1979, p. 64) have been correlated with the Proterozoic Independence Fjord Group (Collinson, 1980, p. 23); they were deposited in a different sedimentological environment from the Skagen Group, and are thought to be older in age.

Name. After the peninsula Skagen on the north-east coast of Peary Land (Plate 1).

Type area. The peninsula Skagen and the area immediately to the west of it (Plate 1).

Thickness. The full thickness is not known as the lower boundary of the group is not exposed. It is estimated to be at least 500 m thick.

Lithology. Throughout the outcrop, the group is tightly folded, and a detailed stratigraphy has not been established from the few localities examined. There appear to be three main divisions. The lowest unit comprises thick beds of structureless, quartzitic sandstones. This succession is overlain by dark coloured, predominantly phyllitic mudstones. The top of the group is formed by a further sequence of thick bedded, structureless quartzitic sandstones, with thin phyllitic mudstone interbeds and very rare pebble conglomerates; on the north side of Frederick E. Hyde Fjord this upper unit appears to be more thinly bedded.

Boundaries. The lower boundary is not exposed. The upper boundary is gradational and is defined at the top of the last massive unit of quartzitic sandstone (c. 40 cm thick), and at the base of dark lime mudstones (calcareous phyllites) of the Paradisfjeld Group. In the known outcrops the boundary strata are strongly folded, but the contact is apparently conformable.

Distribution. The group occurs in the area north-east of Depot Bugt, north-eastern Peary Land, and on the north side of Frederick E. Hyde Fjord in easternmost Johannes V. Jensen Land. An isolated structural inlier crops out on the western tip of Johannes V. Jensen Land between Moa Ø and Lockwood Ø (Plate 1). The group may also be represented in the highly deformed northern part of the fold belt between Benedict Fjord and Kap Morris Jesup, but as sedimentary structures are here no longer visible, stratigraphical relationships cannot be demonstrated (see also below, under Polkorridoren Group).

Geological age. The age of the group is unknown. It underlies the Paradisfjeld Group, the top of which is Cambrian. The Skagen Group could be late Proterozoic, Cambrian, or late Proterozoic to Cambrian in age.

Subdivisions. Three, as yet un-named, formations are recognisable, corresponding to the lower structureless quartzitic sandstones, the middle phyllitic mudstone unit and the upper structureless quartzitic sandstones.

Paradisfjeld Group

History. The term 'Paradisfjeld Marbles and Phyllites' was introduced by Fränkl (1955) for a succession exposed in Polkorridoren, the north–south trending, glacier-filled valley crossing central Johannes V. Jensen Land (fig. 1). The terms 'Malcantone Gletscher Marbles and Slates' and 'Nordgletscher Marbles' were proposed for comparable rocks exposed in the same area (Fränkl, 1955). It was shown by Dawes & Soper (1973) that all these units could be correlated and the term Paradisfjeld Group was introduced to cover the sequence. Our field work shows that the 'Ulvebakkerne Marbles' and part of the 'Sortevæg Marbles and

Fig. 2. Outcrop style of the lime mudstones assigned to the Paradisfjeld Group in central Hazen Land (Plate 1). The light coloured unit is near the top of the Paradisfjeld Group. Note the intense folding with slight northwards vergence. Polkorridoren Group sediments (thin-bedded turbidites) occur in the cores of the synclines. Cliff height approximately 800 m.

Phyllites' (Fränkl, 1955) are also part of the Paradisfjeld Group (Soper *et al.*, 1980; Higgins *et al.*, 1981).

Name. From the mountain Paradisfjeld in central Johannes V. Jensen Land (Plate 1).

Type areas. The eastern tip of Johannes V. Jensen Land, Paradisfjeld, Gertrud Rask Land and Nansen Land (Plate 1).

Thickness. The precise thickness is difficult to estimate due to intense deformation in most areas, but is thought to be at least 1 km and probably much more.

Dominant lithology. The Paradisfjeld Group is dominated by thick sequences of dark grey, impure lime mudstones, while thick beds of light grey limestone conglomerates are characteristic for the top parts of the group (fig. 2). Other varieties include laminated pale grey, orange and yellow limestones, orange calcareous siltstones and occasional dark grey to black non-calcareous mudstones (now shales or phyllites). Low grade metamorphism and deformation has resulted in recrystallisation and obliteration of original structures of rock types in northern areas, and these were usually described in the field as limestones, marbles or calcareous phyllites.

Boundaries. The lower gradational boundary is placed where the carbonate rocks of the group overlie the quartzites of the Skagen Group (see Skagen Group). The upper boundary

is comparatively sharp where the carbonate lithologies give way to the terrigenous mudstones and turbiditic sandstones of the Polkorridoren Group. In the environs of eastern Frederick E. Hyde Fjord, the top of the Paradisfjeld Group is placed at the top of resedimented limestone conglomerates, of which the last bed characteristically has a sandy matrix. Between Moa Ø and Nansen Land, the conglomerates are overlain by up to 15 m of orange weathering lime mudstones (calcareous shales) which here form the top strata of the group. In northern Johannes V. Jensen Land, the top of the group is placed at the top of the last marble or calcareous phyllite bed.

Distribution. The Paradisfjeld Group is widely distributed throughout Johannes V. Jensen Land, Nansen Land and the archipelago in between. Outcrops also occur in the cliffs of Hundeskrænten, north-east of Depotbugt (Plate 1).

Geological age. The top of the group has yielded inarticulate brachiopod fragments and a broken phosphatic internal mould of a spicule of *Chancelloria,* suggesting a Cambrian age for that part of the sequence (Peel & Higgins, 1980). On regional stratigraphic considerations, Surlyk *et al.* (1980) concluded that the group was not younger than Cambrian. It is not known if the whole group is contained within the Cambrian or whether it extends down into the late Proterozoic. If it extends into the Proterozoic, then the underlying Skagen Group must be of wholly Proterozoic age.

Subdivisions. The group is characterised by strong north–south variation of facies which may reflect an original broad zonation parallel to the southern platform. In central Johannes V. Jensen Land, around Paradisfjeld, a four-fold formation scheme can be recognised (1a–d of Dawes & Soper, 1973), while new formations will eventually be introduced for the eastern and western outcrops.

Polkorridoren Group

History. The group corresponds to the Polkorridoren Group of Dawes & Soper (1973) except for the upper boundary which is redefined to include the variegated, red and green 'Frigg Fjord Mudstones' (Fränkl, 1955) and its equivalent, the 'Nysne Gletscher mudstone' (Dawes & Soper, 1973). The latter was originally placed by Dawes & Soper (1973) in their 'Sydgletscher Group' (fig. 1). The Polkorridoren Group includes the 'Polkorridoren Series', 'Grønnemark Sandstones' and 'Grønnemark Shales' of Fränkl (1955). It probably also includes most of Fränkl's 'Nunatak Quartzitic Slates', 'Kap Morris Jesup Quartzphyllites' and 'Sands Fjord Quartzphyllites', but in northern parts of the fold belt deformation and metamorphism have obliterated stratigraphical relationships and these units may thus also include parts of the Skagen Group (cf. Soper *et al.,* 1980; Higgins *et al.*, 1981).

It is convenient at this juncture to indicate why the 'Sydgletscher Group' is disbanded and the component parts placed in the Polkorridoren, Vølvedal, Amundsen Land and Peary Land Groups. Firstly, the original Sydgletscher name was introduced by Fränkl (1955) for a unit of formational rank. Later Dawes & Soper (1973) included this unit in their 'Sydgletscher Group'. The formation is readily recognisable and is being maintained, thus the name has priority for the formation and a new group name is required. Secondly, the

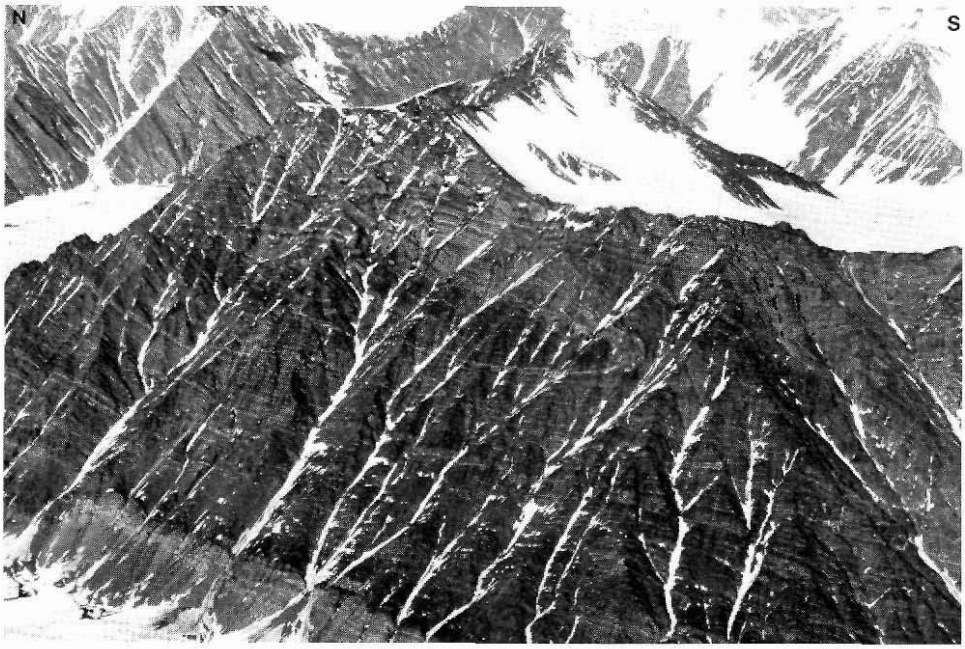

Fig. 3. Typical outcrop style of thick bedded sandstone turbidites assigned to the Polkorridoren Group. Note intense deformation and flat lying folds. Cliff height approximately 1200 m. South end of Hunt Fjord, on the eastern side.

original definition of the 'Sydgletscher Group' did not cover a coherent group of sediments with similar lithologies; these sediments are now referred to the Polkorridoren, Vølvedal, Amundsen Land and Peary Land Groups.

Name. After the glacier-filled pass, Polkorridoren (Plate 1).

Type areas. Polkorridoren, Grønnemark, MacMillan Ø, H. H. Benedict Bjerge (Plate 1).

Thickness. The precise thickness is not known due to structural complexity but is estimated to be at least 2 km.

Dominant lithology. Alternating, thick sandstone and mudstone units. The thickness of these units is of the order of some tens to a few hundred metres. The sandstone units comprise brown weathered, graded or non-graded turbidites with thin mudstone interbeds, while the mudstone units are dark grey or variegated (red, purple or green) and contain scattered thin, fine-grained silty turbidites. The whole group compares well with the concept of 'classical flysch' (fig. 3).

Boundaries. The lower boundary is placed where the carbonate lithologies of the Paradisfjeld Group give way to terrigenous, sandy turbidites and mudstones of the Polkor-

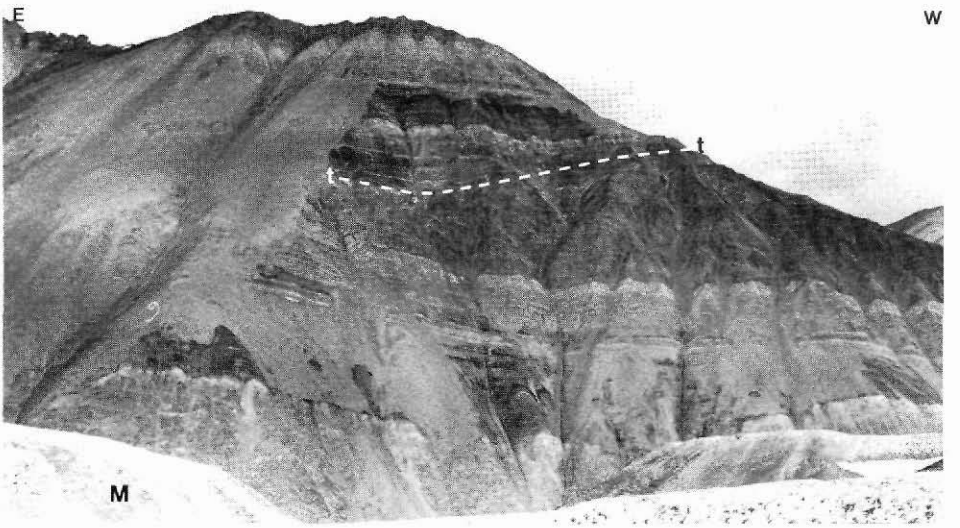

Fig. 4. Cliff section in the Vølvedal Group north of the central part of Vølvedal (Plate 1). Sediments in the foreground are Frigg Fjord Mudstones (M) which are assigned to the Polkorridoren Group. Note thrust (t) repeating succession. The Vølvedal Group here consists predominantly of mudstone and thin-bedded siltstone turbidites. Cliff height approximately 600 m.

ridoren Group (see section on Paradisfjeld Group). The upper boundary is placed where the variegated Frigg Fjord Mudstones are overlain by dark mudstones, cherts and turbidites of the Vølvedal Group. The boundary is transitional, varying over tens of metres and is placed at the top of the last variegated unit.

Distribution. Widely exposed throughout Johannes V. Jensen Land, Nansen Land and the archipelago in between (Plate 1).

Geological age. No age-diagnostic fossils are known from the group. The top of the underlying Paradisfjeld Group contains fossils suggesting a Cambrian age. Graptolites from the top part of the overlying Vølvedal Group indicate an earliest Ordovician age. Thus it is reasonable to conclude that the Polkorridoren Group is contained within the Cambrian, but a more precise age definition is not yet possible (cf. Surlyk *et al.*, 1980).

Subdivisions. Seven mapping divisions have been recognised in central and eastern Johannes V. Jensen Land (Soper *et al.*, 1980). In the western outcrop area, between Moa Ø and Nansen Land, another seven mapping divisions can be distinguished. A clear correlation between the two successions cannot be established due to a scarcity of mappable mudstone divisions in the alpine terrain of western Johannes V. Jensen Land, and due to the structural complexity. However, red and green mudstones form the uppermost unit in both regions, and in the Frigg Fjord region are referred to as the Frigg Fjord Mudstones.

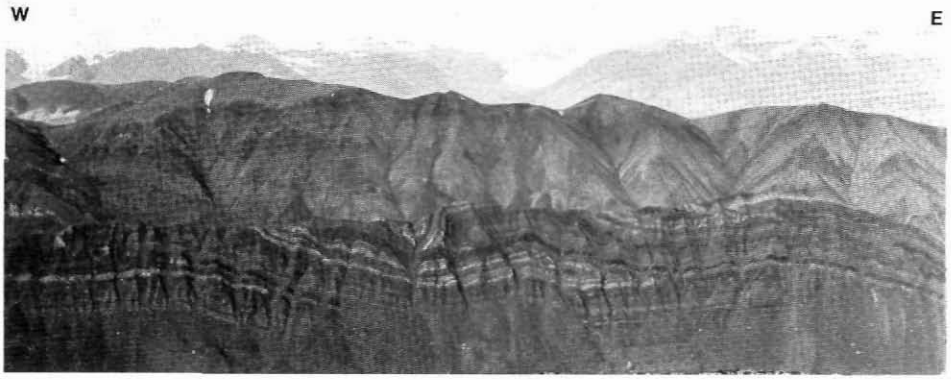

Fig. 5. Coastal cliff section of the Vølvedal Group on the north side of Frederick E. Hyde Fjord (Plate 1). The profile is orientated approximately perpendicular to the fold axes of the anticlines associated with the thrust sheets (Pedersen, 1980). The white band is a conglomerate unit in the top part of the group. Cliff height approximately 500 m.

Vølvedal Group

new group

History. The group (fig. 1) includes the 'Brown Series' of Fränkl (1955) and its equivalent formation '3b' of Dawes & Soper's (1973) 'Sydgletscher Group'. It also includes 'formation A' of Dawes & Soper (1979). The arguments for disbanding the 'Sydgletscher Group' are discussed under the history section of the Polkorridoren Group.

Name. After the valley Vølvedal in the southern part of Johannes V. Jensen Land, where the total thickness of the group is exposed (Plate 1).

Type area. Vølvedal, southern Johannes V. Jensen Land (Plate 1).

Thickness. 600–700 m.

Dominant lithology. The Vølvedal Group is essentially a turbiditic facies association comprising chertified fine-grained, silty distal turbidites, white-weathering chertified, calcareous turbidites, fine to medium bedded sandstone turbidites, subordinate black bedded cherts, black mudstones and redeposited conglomerates (figs 4–6). The group encompasses a crude upwards coarsening unit. Mudstones and cherts dominate the lower part of the group, whilst the middle and upper parts are dominated by turbidites and the top is characterised by redeposited conglomerates dominated by chert and carbonate clasts. The different rock types are chertified to varying degrees, masking original sedimentary structures. As a result the sediments superficially resemble the overlying mudstone and chert dominated Amundsen Land Group, especially in structurally complex areas.

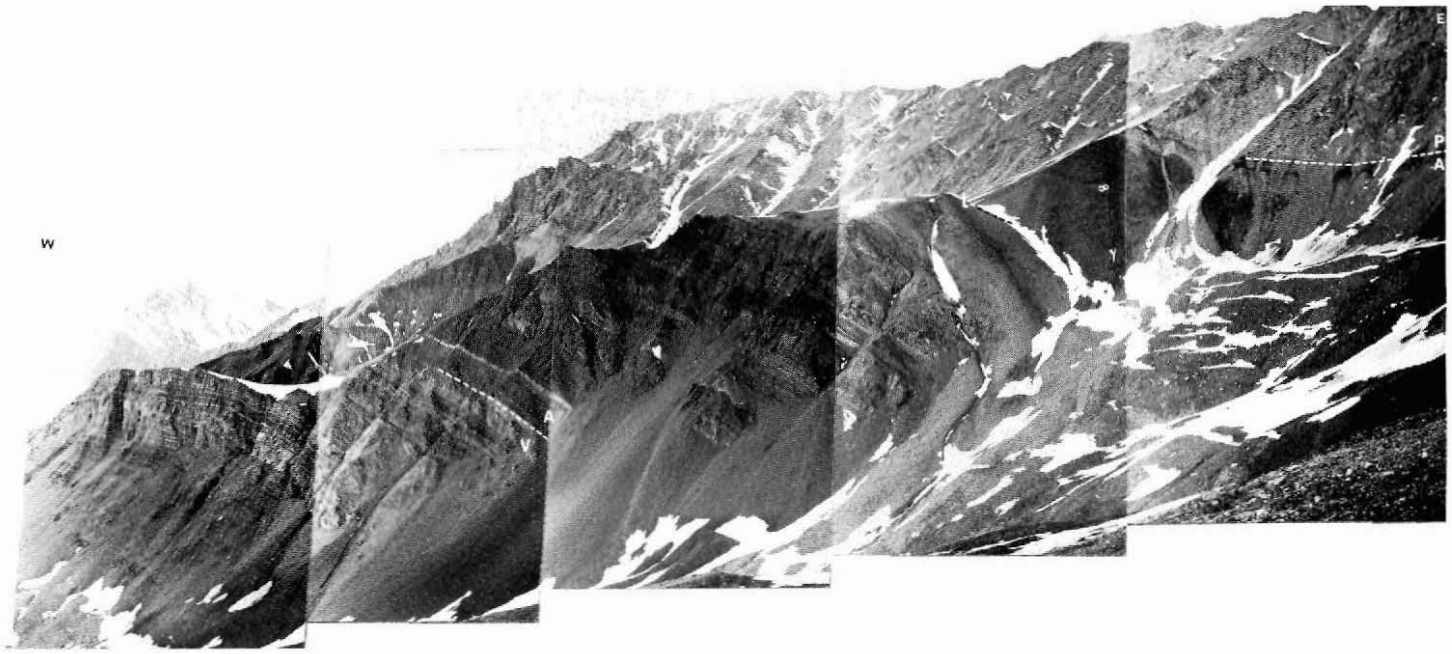

Fig. 6. Top of the Vølvedal Group (V), Amundsen Land Group (A) and the base of the Peary Land Group (P) on the north side of O. B. Bøggild Fjord (Plate 1). Note the thrust (t) repeating the Amundsen Land Group. Thrusts also occur in the base of the Peary Land Group, but they are not shown. Cliff height approximately 1000 m. Here the Vølvedal Group consists of quartzitic turbidites and resedimented limestone conglomerates. The Amundsen Land Group is dominated by mudstones and cherts with the lighter bands representing thin resedimented conglomerates. Siltstones and fine-grained sandstone turbidites constitute the Peary Land Group.

Boundaries. The lower boundary is placed where the variegated Frigg Fjord Mudstones of the Polkorridoren Group are overlain by dark mudstones, cherts and turbidites (see boundary definition under Polkorridoren Group). The upper boundary is placed where medium bedded turbidites and redeposited conglomerates are overlain by black bedded cherts and mudstones. The boundary is sharp and occurs some 40 m above a prominent redeposited conglomerate, throughout southern Johannes V. Jensen Land.

Distribution. Widely distributed in south-central and south-western Johannes V. Jensen Land, and between inner J. P. Koch Fjord and O. B. Bøggild Fjord (Plate 1).

Geological age. The age of the base of the group is unknown. In the upper part of the group in western Amundsen Land, the graptolites *Dictyonema* sp. and *Anisograptus* sp. probably indicate an earliest Canadian (earliest Ordovician) age (M. Bjerreskov, personal communication, 1981). Ten metres below the top of the group on the north coast of B. O. Bøggild Fjord, the presence of *?Adelograptus* probably indicates a late Early Canadian (Early Ordovician) age (M. Bjerreskov, personal communication, 1981). Thus, the upper part of the group is of Early Canadian (Early Ordovician) age and it probably extends well down into the Cambrian.

Subdivisions. Three formations can be recognised in the type area, but in some areas the intense chertification makes a subdivision impossible.

Amundsen Land Group

new group

History. The group (fig. 1) essentially corresponds to the '3c' and '3d' formations of the 'Sydgletscher Group' of Dawes & Soper (1973) and 'formation B' of Dawes & Soper (1979). It approximately corresponds to Fränkl's (1955) 'Nysne Gletscher Graphitic Slates'. The arguments for disbanding the 'Sydgletscher Group' are discussed under the history section of the Polkorridoren Group.

Name. After the south-western peninsula of Johannes V. Jensen Land (Plate 1).

Type area. Amundsen Land (Plate 1).

Thickness. 350–500 m.

Dominant lithology. Black bedded chert and laminated mudstone, often chertified, are characteristic of the group. Chertified thin bedded turbidites and greenish chertified siltstones are subordinate. Some horizons are bioturbated. In some areas, especially in the Nordpasset – Kap Mjølner region (Plate 1), the succession is characterised by thick redeposited chert and limestone conglomerates interbedded with thick calcareous turbidites (figs 6 & 7).

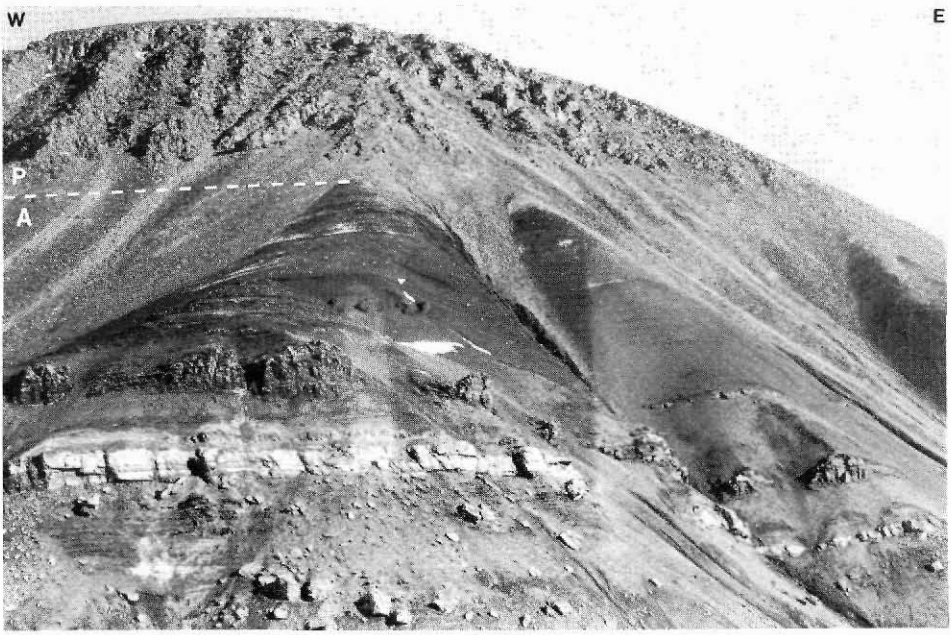

Fig. 7. Mudstones and resedimented conglomerates (lighter bands) of the upper part of the Amundsen Land Group (A) overlain by the Peary Land Group (P) in the northern part of Lauge Koch Land (fig. 8). Cliff height approximately 400 m.

Boundaries. The lower boundary is placed where the medium bedded turbidites of the Vølvedal Group are overlain by black, bedded cherts and mudstones. The upper boundary is placed where the brown to yellow weathering 'classical flysch' turbidites of the Peary Land Group overlie the dark fine-grained sediments of the Amundsen Land Group. The boundary is diachronous and while it is very sharp in some areas, such as around Sydgletscher (Plate 1), it is of a transitional nature in other areas, such as O. B. Bøggild Fjord (Plate 1).

Distribution. The group is widely exposed in south-central and south-western Johannes V. Jensen Land, between inner J. P. Koch Fjord and O. B. Bøggild Fjord, northern Lauge Koch Land, Freuchen Land, probably Nares Land, and Wulff Land (Plate 1; fig. 8).

Geological age. Poorly preserved graptolites, including *Clonograptus* sp. several metres above the base of the group indicate a late Early Canadian age (M. Bjerreskov, personal communication, 1981), similar to the top of the Vølvedal Group. The top of the group is diachronous. In Amundsen Land *Climacograptus miserabilis*, and *Orthograptus* sp. resembling *O. quadrimucronatus*, from the very top of the group indicate a latest Ordovician (Cincinnatian) age (Surlyk *et al.*, 1980). Some 142 m from the top of the group in the Sydgletscher area (Plate 1), the graptolites *Climacograptus rectangularis* and *Atavograptus* aff. *A. atavus* indicate the *atavus* to *cyphus* Zones in the Lower Llandovery (Silurian). Thus, the top of the group is diachronous between the Late Ordovician and Early Silurian (Surlyk *et al.*, 1980).

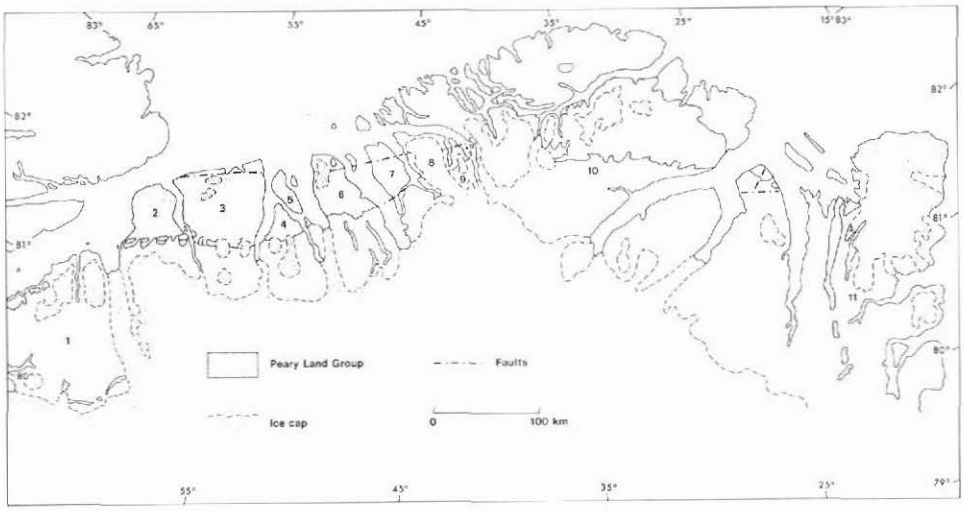

Fig. 8. Distribution of the Peary Land Group in North Greenland. Part of the distribution of the group in Kronprins Christian Land from J. S. Peel (personal communication, 1981). Washington Land (1), Hall Land (2), Nyeboe Land (3), Warming Land (4), Hendriks Ø (5), Wulff Land (6), Nares Land (7), Freuchen Land (8), Lauge Koch Land (9), Peary Land (10) and Kronprins Christian Land (11).

Subdivisions. The group is divisible into two mainly fine-grained formations corresponding to the bedded chert and laminated mudstone units, and a southern resedimented conglomeratic formation.

Peary Land Group

History. Hurst (1980) erected the Peary Land Group. The group encompasses the 'Cape Rawson Beds' of Feilden & De Rance (1878) and the 'Cape Rawson Group' in the sense of Dawes (1966, 1971) and Dawes & Soper (1973). The group also includes the sediments in North Greenland that were referred to the Imina Group of Ellesmere Island, Canada (cf. Dawes, 1971, 1976). Also included are the 'Un-named Silurian black shale formation' and the 'Un-named Silurian flysch formation' of Christie & Peel (1977), 'formation C' of Dawes & Soper (1979) and the 'Sydgletscher Sandstones' (Fränkl, 1955) of the 'Sydgletscher Group' (Dawes & Soper, 1973). The arguments for disbanding the 'Sydgletscher Group' are discussed under the history section of the Polkorridoren Group. The Profilfjeldet Shale of Kronprins Christian Land (Nielsen, 1941; Fränkl, 1954) and the Kjoveslette Sandstones (Fränkl, 1956) are also included in the group, as well as the Hendrik conglomerate of Dawes (1976). The recently redefined Cape Schucert Formation together with the newly erected Lafayette Bugt Formation (Hurst, 1980) are also assigned to the group in Washington Land. The extent of the 'Polaris Harbour Formation' of Koch (1929) is now known (Dawes & Haller, 1979) and these strata are also included in the Peary Land Group; however, use of this formation name has been discontinued (Lane *et al.*, 1980).

Fig. 9. Fining-upward cycles in the Peary Land Group at the north-eastern end of Esrum Elv, north Peary Land (Plate 1). Cliff height approximately 800 m.

Name. After Peary Land where the group forms the uppermost stratum in most of the area (fig. 8).

Type area. The constituent formations have type areas in North Greenland, from Kronprins Christian Land to Washington Land (fig. 8).

Thickness. The group reaches its maximum thickness of about 3 km in Peary Land. In the western end of the outcrop belt in Washington Land it has decreased to about 500 m.

Dominant lithology. The bulk of the group comprises yellow to brown weathering turbidites of 'classical flysch' appearance (figs 9–11); the weathering colour is due to significant amounts of carbonate material in the cement or matrix. A major mudstone unit occurs in the middle of the group and the proportion of mudstone increases to the west. In the lower half of the group along the south coast of Frederick E. Hyde Fjord and in Washington Land, a sequence of redeposited limestone conglomerates occurs. The upper part of the group is characterised by abundant chert pebble conglomerates.

Fig. 10. Mudstones and turbidites of the Peary Land Group (P) overlying platform carbonates (c) on the east side of Lauge Koch Land (Plate 1).

Boundaries. The lower boundary is placed where the black cherts and mudstones of the Amundsen Land Group are overlain by buff weathering turbidites of the Peary Land Group. Along the southern margin of the outcrop belt (fig. 8), the group overlaps mainly Silurian platform carbonates. The group forms the top stratum in the western part of the fold belt. In the Peary Land region it is overlain, with angular unconformity, by Late Palaeozoic conglomerates and sandstones in red-bed facies of the Mallemuk Mountain Group (Håkansson, 1979).

Distribution. The group is widespread in North Greenland, from Kronprins Christian Land in the east to Washington Land in the west (fig. 8).

Geological age. The base of the group is diachronous between the latest Ordovician and Early Silurian (see section on Amundsen Land Group). The youngest graptolites occur in western North Greenland where *Monograptus* cf. *M. transgradiens* occurs near the top of the sequence, indicating a Late Silurian (Pridoli) age. There is no definite evidence of Devonian strata, but it is possible that the top of the group may prove to reach into the earliest Devonian (cf. Surlyk *et al.*, 1980).

Subdivisions. The group is subdivided into eight formations, several of which are lateral equivalents (Hurst & Surlyk, in press).

Fig. 11. Thin bedded mudstone and siltstone turbidites of the Peary Land Group near the northern coast of Hall Land (fig. 8). Cliff height approximately 600 m.

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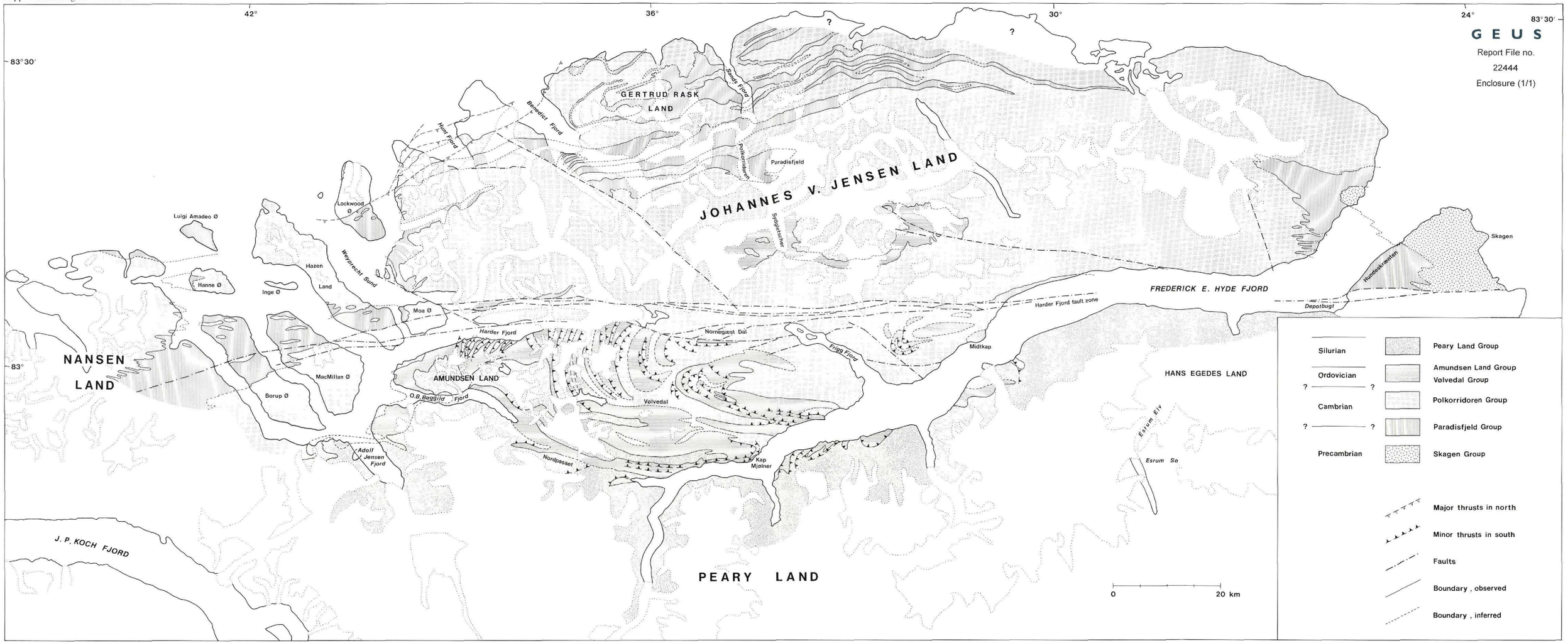
Plate 1

Distribution of the Skagen Group, Paradisfjeld Group, Polkorridoren Group, Vølvedal Group and Amundsen Land Group in eastern North Greenland. Place names mentioned in text are indicated here and on fig. 8.


42°
36°
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GEUS
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Enclosure (1/1)
GERTRUD RASK LAND
JOHANNES V. JENSEN LAND
NANSEN LAND
AMUNDSEN LAND
PEARY LAND
HANS EGEDES LAND
FREDERICK E. HYDE FJORD
J. P. KOCH FJORD
Sands Fjord
Benedict Fjord
Hunt Fjord
Polkorridoren
Paradisfjeld
Sydpolarisfjeldene
Lockwood Ø
Luigi Amadeo Ø
Hanne Ø
Inge Ø
Hazen Land
Weyprecht Sund
Moa Ø
MacMillan Ø
Borup Ø
Harder Fjord
Harder Fjord fault zone
Nordenskiöld Dal
Frigg Fjord
Midtkap
O.B. Boggild Fjord
Adolf Jensen Fjord
Nordpasset
Kap Mjølner
Volvedal
Esrum Elv
Esrum Sø
Depotbugt
Hundeskrenten
Skagen
0
20 km
Silurian
Ordovician
Cambrian
Precambrian
Peary Land Group
Amundsen Land Group
Volvedal Group
Polkorridoren Group
Paradisfjeld Group
Skagen Group
Major thrusts in north
Minor thrusts in south
Faults
Boundary , observed
Boundary , inferred