250_000 CO	Name	Description
1000	lake	Body of water located inland
1001	Moraine and undifferentiated cover	Accumulation of unconsolidated glacial debris (soil and rock) transported by a glacier
1002	Lithology unknown	Outcrops with unknown lithology
1003	Jurassic mafic dikes	Basaltic lavas and minor intrusions of Jurassic age crop out at several localities in western Dronning Maud Land. Flood basalts and dikes are exposed at Vestfjella, Heimefrontfjella and Kirwanveggen, whereas dikes are exposed in the Ahlmannryggen, Mannefallknausane and H.U. Sverdrupfjella areas. The basaltic lavas are cut by the mafic dikes and the gabbroic intrusions. The lavas and intrusions were formed during the Gondwana break-up.
1004	Jurassic basalt	Basaltic lavas and minor intrusions of Jurassic age crop out at several localities in western Dronning Maud Land. Flood basalts and dikes are exposed at Vestfjella, Heimefrontfjella and Kirwanveggen, whereas dikes are exposed in the Ahlmannryggen, Mannefallknausane and H.U. Sverdrupfjella areas. The basaltic lavas are cut by the mafic dikes and the gabbroic intrusions. The lavas and intrusions were formed during the Gondwana break-up.
1005	Jurassic gabbro	Basaltic lavas and minor intrusions of Jurassic age crop out at several localities in western Dronning Maud Land. Flood basalts and dikes are exposed at Vestfjella, Heimefrontfjella and Kirwanveggen, whereas dikes are exposed in the Ahlmannryggen, Mannefallknausane and H.U. Sverdrupfjella areas. The basaltic lavas are cut by the mafic dikes and the gabbroic intrusions. The lavas and intrusions were formed during the Gondwana break-up.
1006	Sistefjell syenite	The Sistefjell intrusion is approximately 10 km in diameter and is the largest Mesozoic pluton in western Dronning Maud Land. The main intrusive phase is a Si-saturated syenite consisting of alkali feldspar, quartz, sodic-calcic amphibole, aegirine-augite, and minor fayalite, aegirine and aenigmatite. Associated sills and dikes include fine-grained syenite, quartz porphyry and fine-grained granite.
1007	Tvora syenite (outer layer)	The Jurassic Tvora syenite crops out at the nunatak Tvora and consists of a quartz syenite (Si-saturated) pluton approximately 3 km in diameter, which intrudes gneisses of the Jutulrøra complex. Two lithological facies have been recognized, an outer layer and an inner layer. The outer layer is mesocratic syenite with a locally melanocratic part. The outer layer is coarse grained, homogeneous and contains varying proportions of perthite, amphibole, clinopyroxene, biotite and opaques. Quartz and fayalite occur in the melanocratic parts.
1008	Tvora syenite (inner layer)	The Jurassic Tvora syenite crops out at the nunatak Tvora and consists of a quartz syenite (Si-saturated) pluton approximately 3 km in diameter, which intrudes gneisses of the Jutulrøra complex. Two lithological facies have been recognized, an outer layer and an inner layer. The inner layer is a plug-like leucocratic intrusion with xenoliths of the outer layer (mesocratic syenite). The inner layer is composed of perthite, plagioclase, clinopyroxene, hornblende, olivine, nepheline and magnetite
1009	Straumsvola syenite (outer layer)	The Jurassic Straumsvola syenite is well exposed, approximately 7 km in diameter and intrudes the Proterozoic Jutulrøra complex. The Straumsvola syenite is a coarse-grained nepheline syenite composed of alkali-feldspar, nepheline and variable quantities of mafic minerals (e.g. Na-clinopyroxene, amphibole and biotite). The Straumsvola syenite is composed of a massive outer layer and a layered central layer.
1010	Straumsvola syenite (mesocratic layer)	The Jurassic Straumsvola syenite is well exposed, approximately 7 km in diameter and intrudes the Proterozoic Jutulrøra complex. The Straumsvola syenite is a coarse-grained nepheline syenite composed of alkali-feldspar, nepheline and variable quantities of mafic minerals (e.g. Na-clinopyroxene, amphibole and biotite). The mesocratic syenite layer is ca. 5 m wide near vertical, ring dike-like, discordant body, which divides the Straumsvola syenite into central and outer parts.
1011	Straumsvola syenite (central layer)	The Jurassic Straumsvola syenite is well exposed, approximately 7 km in diameter and intrudes the Proterozoic Jutulrøra complex. The Straumsvola syenite is a coarse-grained crystalline nepheline syenite composed of alkali-feldspar, nepheline and variable quantities of mafic minerals (e.g. Na-clinopyroxene, amphibole and biotite). The Straumsvola syenite is composed of a massive outer layer and a layered central layer. The central layer consists of a 350 m thick sequence where the layering is defined by varying amounts of alkali-feldspar and mafic minerals.

1012	Carboniferous-Permian sedimentary rocks	Carboniferous-Permian sedimentary rocks crop out at Vestfjella and are composed of sandstones, siltstones, shales and mudstones. The sedimentary strata also contain black shale layers, which contain a relatively rich and well-preserved palynoflora as well as macroscopic plant fossils.
1013	Amelang Formation	Amelang Formation unconformably overlies the Urfjell Group. The Amelang Formation comprises sandstones and conglomerates and is characterized by numerous ferruginous concretions (15 cm in diameter), which occur in the higher part of the sequence.
1014	Urnosa Formation	The Urfjell Group (maximum thickness of 1650m) is a tectonically controlled package of very low-grade meta-sandstones and mudstones. The Urfjell Group represents a braided to sheetwash fluvial system, possibly deposited within a half graben setting. The Urfjell Group has suffered moderate deformation prior to the deposition of the overlying Amelang Formation. The Urfjell Group is divided into four mappable units (i.e. Urnosa Formation, Tunga Formation, Kuvungen Formation and Uven Formation). The Urnosa Formation is a 200 m thick sequence of sandstones, micaceous sandstones and mudstones.
1015	Kuvungen Formation	The Urfjell Group (a maximum thickness of 1650m) is a tectonically controlled package of very low-grade meta-sandstones and mudstones. The Urfjell Group represents a braided to sheetwash fluvial system, possibly deposited within a half graben setting. The Urfjell Group has suffered moderate deformation prior to the deposition of the overlying Amelang Formation. The Urfjell Group is divided into four mappable units (i.e. Urnosa Formation, Tunga Formation, Kuvungen Formation and Uven Formation). The Kuvungen Formation is a 480 m thick package of fine-grained to pebbly cross-bedded sandstones and gravels.
1016	Tunga Formation	The Urfjell Group (a maximum thickness of 1650m) is a tectonically controlled package of very low-grade meta-sandstones and mudstones. The Urfjell Group represents a braided to sheetwash fluvial system, possibly deposited within a half graben setting. The Urfjell Group has suffered moderate deformation prior to the deposition of the overlying Amelang Formation. The Urfjell Group is divided into four mappable units (i.e. Urnosa Formation, Tunga Formation, Kuvungen Formation and Uven Formation). The 380 m thick Tunga Formation is lithologically similar to the Uven Formation and consists of green to grey, moderately sorted, medium-grained to pebbly monotonous sandstones and conglomerates with interbeds of arkose and shale.
1017	Uven Formation	The Urfjell Group (a maximum thickness of 1650m) is a tectonically controlled package of very low-grade meta-sandstones and mudstones. The Urfjell Group represents a braided to sheetwash fluvial system, possibly deposited within a half graben setting. The Urfjell Group has suffered moderate deformation prior to the deposition of the overlying Amelang Formation. The Urfjell Group is divided into four mappable units (i.e. Urnosa Formation, Tunga Formation, Kuvungen Formation and Uven Formation). The basal Uven Formation is tectonically in contact with basement and consists of 425 m of green to grey, moderately sorted, medium-grained to pebbly monotonous sandstones. Small to large scale cross bedding is common.
1018	Mafic dikes	The mafic dikes (Neoproterozoic-Early Cambrian - 488-434 Ma) consist of biotite, clinopyroxene, plagioclase, amphibole ± orthopyroxene. Accessory minerals are ilmenite, apatite, magnetite and sulfide minerals. The dikes are some tens of centimeters to several tens of meters thick. Distinct chilled margins are commonly observed. The dikes intrude Paleozoic granite, but are locally cut by the younger veins of Paleozoic granite and pegmatite. Some dikes show a distinct schistose structure parallel to the margins.
1019	Syenite dikes	Syenite dikes are melanocratic alkaline rocks, which intrude the central and northern parts of the Brattskarvet granites. The dikes appear locally with gradational margins against the host (Brattskarvet granites), as rows of disrupted fragmental segments, as scattered enclaves and as poorly defined schlieren. The rocks consist of perthitic K-feldspar, sodic augite or aegirine augite, amphibole and biotite. Plagioclase is generally absent, and minor quartz occurs in a few specimens. The mafic minerals are present as inclusions in K-feldspar. Secondary actinolite overgrows augite and arfvedsonite and occurs as large, interstitial, anhedral aggregates. Apatite and titanite are minor constituents, and allanite, zircon and monazite are accessory phases. Catapleiite and aenigmatite have been provisionally identified.
1020	Granite, syenite, in part charnockite	Post-tectonic (i.e. post-Pan-African) dikes and stocks of granite, aplite and pegmatite are < 1 m to several tens of meters in width. In most cases the contact with the host rocks is sharp. The granites are reddish, gray and light gray, usually fine- to medium-grained and massive. They are composed of K-feldspar, plagioclase, quartz and biotite, with or without hornblende. Aplite and pegmatite are light gray or pinkish, composed mainly of plagioclase, quartz and K-feldspar, with or without biotite.

1021	Brattskarvet granite	The Brattskarvet granite (419 ± 4 Ma) comprises monzonite, quartz monzogranite and monzogranite, and syenitic dikes. Gradational transitions between these lithologies suggest large-scale stratification. The Brattskarvet granites intrude the Rootshorga complex in the northern extremity of H.U. Sverdrupfjella. The massif covers an area of ca. 100 km². The granitoids are strongly foliated along their margins, whereas a weak foliation is present within the batholith. The main fabric in the surrounding gneisses is conformable with the outline of the intrusion. A weak alignment of biotite and schlieren relicts is present. Local weak layering/foliations, augen gneiss texture, agmatitic amphibolites and xenoliths of country rocks suggest that the batholith has a funnel-like structure. The lack of any penetrative foliation in the Brattskarvet granites indicates that these intrusions post-dated significant deformation.
1022	Metagabbro	Metagabbro (Neoproterozoic) occurs as small pods of mafic material, which intrude the gneisses of the Kirwanveggen complex. The unit comprises amphibole, garnet, pyroxene, feldspar and quartz.
1023	Diorite	Diorite (Neoproterozoic) occurs as small pods of mafic material, which intrude the Uven Formation of the Urfjell Group. The diorite comprises amphibole, garnet, pyroxene, feldspar and quartz.
1024	Charnockite	Charnockite is a huge body of a coarse-grained, granitic-syenitic igneous rock, which occurs from Hochlinfjellet eastward to the Oddesteinen area. These rocks represent a young event of plutonism. The rocks are clearly distinguished by their dark brown color, which is recognizable even from a long distance. Intrusive contacts of the charnockite to the surrounded metamorphic rocks were observed at several places. Small dikes and veins of the charnockite are observed. Numerous angular xenoliths of gneisses and country rocks are found in the charnockite. The rocks have a coarse-grained, subangular mosaic texture, locally phenocrystic, and consist of dark quartz, mesoperthitic K-feldspar and antiperthitic plagioclase, hornblende, biotite, orthopyroxene, clinopyroxene and locally olivine. Olivine grains are mostly serpentinized, clinopyroxene is enclosed in hornblende, and orthopyroxene has exsolution lamellae and is commonly replaced by biotite-quartz aggregates.
1025	Anorthosite/meta-anorthosite	Anorthosite/meta-anorthosite (625 - 506 Ma) intruded a basement consisting of supracrustal rocks comprising pelitic schists, quartzites, marbles, calc-silicate rocks, metavolcanics and orthogneisses. The anorthosite/meta-anorthosite is divided into two complexes and are associated with gabbroic and noritic rocks: i) a large complex about 900 Km^2 in area in Gruberfjella and ii) a smaller complex in the northern part of the Humboldtfjella. The anorthosite/meta-anorthosite comprise variable amounts of leucogabbro, leuconorite, gabbro and norite. Where they are undeformed and consist of a mesh of plagioclase crystals, and interstitial pyroxene, magnetite and ilmenite. Layers and lenses of ultramafic composition can be found. The anorthosite/meta-anorthosite is cut by pegmatitic dikes up to 10 m wide and a few hundred meters long.
1026	Granite and syenite	Granite and syenite are medium-grained, weakly foliated homogeneous granitic bodies. The granite contains subangular xenoliths of the surrounding metamorphic rocks. A faint gneissosity is locally visible and defined by the variation of biotite content. The granite and granosyenite are cut by veins and dikes of pegmatites, granitic composition. The granites and granosyenites are composed of microcline, K-feldspar, plagioclase, quartz, biotite and hornblende. Apatite, sphene, tourmaline, zircon, ilmenite and epidote are accessories.
1027	Gabbro	Gabbroic intrusions are usually present as small intrusions. A larger gabbro intrusion (up to 15 km in diameter) crop out in the Zwieselhøgda area and is interfingering with granitoid rocks. The gabbro is medium- to coarse-grained and is composed of plagioclase and pigeonite, the latter hosts augitic pyroxene lamellae. Minor phases are magnetite, ilmenite, amphiboles (cummingtonite and ferrotschermakite), orthopyroxene, apatite, antiperthite, zircon and rare olivine. Retrogressed parts of the gabbro contain biotite and increasing amounts of amphiboles are found.
1028	Granodiorite-diorite	This unit occurs as dikes ranging in width from several meters to approximately ten meters. The rock is melanocratic to mesocratic and fine- to medium-grained. In places, the rocks show agmatitic and schollen structures with a predominant neosome. The granodiorite-diorite comprise biotite, K-feldspar, plagioclase, quartz, ± clinopyroxene ± hornblende.
1029	Olivine monzonite	Olivine monzonite is coarse-grained and is characterized by dark greenish gray to dark brownish gray color. The rock is characterized by large idiomorphic crystals of mesoperthite, and consists of clinopyroxene, olivine, orthopyroxene and antiperthitic plagioclase with minor zircon, apatite and iron oxide. Both biotite and hornblende occur as fine-grained flakes surrounding orthopyroxene and clinopyroxene, respectively. Locally the monzonite is bleached along later pegmatite or aplite. The bleached part contains large amounts of secondary biotite and hornblende instead of olivine, orthopyroxene and clinopyroxene.

1030	Pyroxene syenite	This unit include layered syenite, melanocratic syenite, quartz syenite, porphyritic syenite and coarse syenite. The layered syenite shows conspicuous rhythmic layering ranging from a few cm to a few m in thickness. Euhedral K-feldspar and mafic minerals in the syenite show preferred orientation. In some places at the contact between the syenite and the country rocks, mylonitic structures which is parallel to the contact can be observed. Small dikes of fine-grained melanocratic syenite discordantly intrude into the layered syenite. Medium- to fine-grained quartz syenite occurs as dikes, sheets or lenticular veins intruding the layered syenite and the melanocratic syenite. The layered syenite is composed mainly of K-feldspar, biotite, amphibole and pyroxene with accessory sphene, apatite, zircon, and magnetite. The melanocratic syenites have minerals of the same assemblage as the layered syenite, but they are fine-grained and very rich in mafic minerals. The quartz syenite contains K-feldspar, plagioclase, quartz and amphibole with or without biotite and pyroxene. The porphyritic syenite is medium- to coarse-grained characterized by porphyritic texture of potash feldspar. The coarse syenite is very coarse-grained massive syenite. The coarse syenite is light-colored due to dominant K-feldspar which is 2-3 cm in size.
1031	Granodiorite-diorite	This unit (620-500 Ma) occurs as dikes ranging in width from several meters to approximately ten meters. The rock is melanocratic to mesocratic and fine- to medium-grained. In places, the rocks show agmatitic and schollen structures with a predominant neosome. The granodiorite-diorite comprise biotite, K-feldspar, plagioclase, quartz, ± clinopyroxene ± hornblende.
1032	Metagabbro (Balchenfjella)	Metagabbro (Balchenfjella; 620-500 Ma) forms a lenticular body, nearly a kilometer long, within the migmatitic gneisses near the north end of Berrheia. The metagabbro is weakly foliated and dark-colored. Lath-shaped plagioclase crystals are occasionally observed on the weathered surface. The mineral assemblage is orthopyroxene, clinopyroxene, hornblende, biotite, plagioclase, quartz ± garnet.
1033	Syenite	The rock (550-530 Ma) is melanocratic, fine- to medium-grained, gray to dark gray and shows a weak foliation due to the orientation of mafic minerals and inclusions. This pyroxene-free facies is relatively massive compared with the pyroxene syenite. The syenite is intruded by dikes of granitic and basic (metamorphosed) composition. The syenite comprise hornblende, biotite and K-feldspar with minor plagioclase and quartz. Titanite, apatite, zircon and opaque minerals are accessory phases.
1034	Pyroxene syenite	Pyroxene syenite is composed of layered syenite, melanocratic syenite, quartz syenite, porphyritic syenite and coarse syenite, and is dated to 550-530 Ma. The layered syenite shows conspicuous rhythmic layering ranging from a few cm to a few m in thickness. Euhedral K-feldspar and mafic minerals in the syenite show preferred orientation. In some places at the contact between the syenite and the country rocks, mylonitic structures which is parallel to the contact can be observed. Small dikes of fine-grained melanocratic syenite intrude the layered syenite. Medium- to fine-grained quartz syenite occurs as dikes, sheets or lenticular veins intruding the layered syenite and the melanocratic syenite. The layered syenite is composed mainly of K-feldspar, biotite, amphibole and pyroxene with accessory sphene, apatite, zircon, and magnetite. The melanocratic syenites have the same minerals as the layered syenite, but they are fine-grained and rich in mafic minerals. The quartz syenite contains K-feldspar, plagioclase, quartz, amphibole ± biotite ± pyroxene. The porphyritic syenite is medium- to coarse-grained characterized by porphyritic texture of K-feldspar. The coarse syenite is massive, light-colored and with K-feldspar crystals up to 2-3 cm in size.
1035	Tonalitic gneiss	The calc-alkaline Nils Larsenfjellet tonalitic gneiss (772-730 Ma) crops out in the northern end of Nils Larsenfjellet and the southeastern end of Widerøefjellet. The tonalitic gneiss in Nils Larsenfjellet is sometimes mingled with granitic and quartz dioritic rocks. A weak mylonitic texture is identified under the microscope. The rocks are mainly composed of plagioclase, quartz, and biotite, with minor amounts of alkali-feldspar. The accessory minerals are epidote, apatite, zircon, rutile, titanite, and opaque minerals. Plagioclase often shows oscillatory zoning.
1036	Pelitic gneiss and schist	Pelitic gneiss and schist are medium- to coarse-grained garnet-quartz-K feldspar-bearing rocks. Biotite, sillimanite, cordierite and plagioclase are major phases. Hornblende- and pyroxene-bearing assemblages can be found. Kyanite occur as inclusions in garnet (for example in the Medmulen area). Andalusite may occur as large fresh porphyroblasts which are overgrown by biotite and/or sillimanite. The pelitic gneisses and schists are intercalated with calc-silicate, marbles, metaquartzite and felsic granitic gneisses. Intercalation of garnet-bearing amphibolite and orthopyroxene-bearing gneisses occurs locally.
1037	Banded gneiss	Banded gneiss includes brown pyroxene-bearing gneiss, leucocratic gneiss, metapelite and garnet amphibolite. The gneisses have experienced widespread anatexis. The banded gneisses reveal a variable grain size on the sample scale, being characteristic for the different layers defining the foliation. The granoblastic matrix is made up of anhedral quartz and feldspar grains. Biotite flakes show a preferred orientation and are

		concentrated in thin layers together with pyroxene. Garnet is evenly distributed throughout the rock. Apatite, monazite, zircon, and ilmenite are accessory minerals.
1038	Metamorphosed ultramafic rocks	Two narrow dike-like bodies of serpentinized ultramafic composition are observed in southern Spøta, Hochlinfjellet. The outcrops are inaccessible, although samples of the rocks were found in a moraine.
1039	Amphibolite	Amphibolite commonly occurs as layers and lenses up to a few tens of meters across, which are concordant or sub-concordant with the host rocks. Discordant amphibolites occur as small bodies enclosed in gneisses, calc-silicate rocks and syenites. The amphibolite is locally massive. The principal minerals are amphibole, clinopyroxene and biotite, with subordinate amounts of plagioclase, K-feldspar and quartz. In higher grade lithologies garnet, clinopyroxene and orthopyroxene are present in the assemblages.
1040	Banded gneiss (metavolcanics)	Mafic and ultramafic rocks, metamorphosed at amphibolite- and granulite facies conditions, occur as lenses up to several meters in country rocks. The lenses consist of clinopyroxene, amphibole, olivine, plagioclase, biotite and opaque mineral. These rocks are dark-colored due to a dark gray plagioclase and the abundant mafic minerals such as garnet and clinopyroxene.
1041	Marble, calc-silicate rock and skarn	The marble, calc-silicate rock and skarn unit occurs mostly as concordant or sub-concordant layers and lenses up to several tens of meters across within the country rocks. The calc-silicate rocks form small pods enclosed in marble, bands between marble and adjacent gneisses, and layers and lenses up to a few meters across intercalated with biotite-hornblende gneiss and amphibolite. Calc-silicate rocks are composed of wollastonite, scapolite, clinopyroxene, olivine, garnet, anorthitic plagioclase, calcite, quartz, graphite, sphene and zircon. The marble is composed of calcite with less scapolite, phlogopite, clinopyroxene, graphite and zircon.
1042	Garnet-biotite gneiss	The garnet-biotite gneiss includes pelitic, quartzofeldspathic and feldspathic rocks enriched in biotite, garnet, sillimanite, plagioclase, K-feldspar, quartz and rarely corundum, hercynite or gahnite. Kyanite is present in some places. Locally, retrograde metamorphism results in resorption of garnet by secondary biotite. The gneisses exhibit granoblastic to lepidoblastic texture, and range from medium- to coarse-grained. Migmatitic or augen structures are locally developed.
1043	Pelitic gneiss and schist	Pelitic gneiss and schist are medium- to coarse-grained garnet-quartz-K feldspar-bearing rocks. Biotite, sillimanite, cordierite and plagioclase are major phases. Hornblende- and pyroxene-bearing assemblages can be found. Kyanite occur as inclusions in garnet (for example in the Medmulen area). Andalusite may occur as large fresh porphyroblasts which are overgrown by biotite and/or sillimanite. The pelitic gneisses and schists are intercalated with calc-silicate, marbles, metaquartzite and felsic granitic gneisses. Intercalation of garnet-bearing amphibolite and orthopyroxene-bearing gneisses occurs locally.
1044	Banded gneiss	Banded gneiss includes brown pyroxene-bearing gneiss, leucocratic gneiss, metapelite and garnet amphibolite. The gneisses have experienced widespread anatexis. The granoblastic matrix is made up of anhedral quartz and feldspar grains. Biotite flakes show a preferred orientation and are concentrated in thin layers together with pyroxene. Garnet is evenly distributed throughout the rock. Apatite, monazite, zircon, and ilmenite are accessory minerals.
1045	Mafic gneiss and schist/mafic lenses and dikes	Mafic and ultramafic rocks are metamorphosed in the amphibolite or granulite facies field. They occur as lenses, up to several meters long, within host gneisses. The mafic rocks consist of clinopyroxene, amphibole, olivine, plagioclase, biotite, garnet and opaque mineral.
1046	Garnet-biotite gneiss	The garnet-biotite gneiss includes pelitic, quartzofeldspathic and feldspathic rocks enriched in biotite, garnet, sillimanite, plagioclase, K-feldspar, quartz and rarely corundum, hercynite or gahnite. Kyanite is present in some places. Locally, retrograde metamorphism results in resorption of garnet by secondary biotite. The gneisses exhibit granoblastic to lepidoblastic texture, and range from medium- to coarse-grained. Migmatitic or augen structures are locally developed.
1047	Sillimanite-garnet-biotite gneiss	The sillimanite-garnet-biotite gneiss is intercalated with garnet-biotite gneisses. Staurolite has been found in sillimanite-spinel-corundum-garnet-biotite gneiss, which also contain cordierite, plagioclase, K-feldspar and quartz. Orthopyroxene and gedrite occur locally.
1048	Garnet-biotite-hornblende gneiss	The gneisses are coarse- to medium-grained with granoblastic texture, and range from mafic to intermediate in composition. Melanocratic (biotite- and/or hornblende-rich) and leucocratic (plagioclase-rich) layers, from 1 cm or less, to more than 10 cm in thickness, are developed. The mineral assemblage is composed of garnet, biotite, amphibole, plagioclase, quartz ± clinopyroxene ± orthopyroxene.

1049	Biotite-hornblende gneiss	The biotite-hornblende gneiss is a well-layered rock unit due to the alternation of biotite-hornblende-rich and quartzofeldspathic bands. Relative proportions of mafic and felsic minerals vary even within a band. It is composed mainly of hornblende, biotite, plagioclase, K-feldspar and quartz, with minor amounts of apatite, zircon, sphene and opaque minerals. Clinopyroxene can be observed. The biotite-hornblende gneiss commonly alternates with amphibolite and hornblende gneisses and in places is accompanied by layers and lenses of garnet-biotite gneisses, calc-silicate rocks, and mafic granulite lenses.
1050	Amphibolite	Amphibolite commonly occurs as layers and lenses up to a few tens of meters across, which are concordant or sub-concordant with the host rocks. Discordant amphibolites occur as small bodies enclosed in gneisses, calc-silicate rocks and syenites. The amphibolite is locally massive. The principal minerals are amphibole, clinopyroxene and biotite, with subordinate amounts of plagioclase, K-feldspar and quartz. In higher grade lithologies garnet, clinopyroxene and orthopyroxene are present in the assemblages.
1051	Mafic granulite/mafic lenses	Mafic and ultramafic granulites occur in lenses up to several meters in the country rocks. These lenses consist of clinopyroxene, orthopyroxene, amphibole, olivine, plagioclase, biotite and opaque mineral. Sapphirine may be found. This rock is characteristically poorly foliated and dark-colored due to a dark gray color of plagioclase in addition to abundant mafic minerals such as garnet, clinopyroxene and orthopyroxene. A reaction zone between these lenses and the country rocks may occur where micas and amphiboles are developed.
1052	Marble, calc-silicate rock and skarn	The Marble, calc-silicate and skarn occur mostly as concordant or subconcordant layers and lenses up to several tens of meters across in the country rocks. The calc-silicate rocks form small pods enclosed in the marble, bands between the marble and adjacent gneisses, and layers and lenses up to a few meters across intercalated in the biotite-homblende gneiss and amphibolite. Cale-silicate rock is composed of wollastonite, scapolite, clinopyroxene, olivine, garnet, anorthitic plagioclase, calcite, quartz, graphite, sphene and zircon. The marble is composed of calcite with less scapolite, phlogopite, clinopyroxene, graphite and zircon.
1053	Garnet-biotite gneiss	The garnet-biotite gneiss includes pelitic, quartzofeldspathic and feldspathic rocks enriched in biotite, garnet, sillimanite, plagioclase, K-feldspar, quartz and rarely corundum, hercynite or gahnite. Kyanite is present in some places. Locally, retrograde metamorphism results in resorption of garnet by secondary biotite. The gneisses exhibit granoblastic to lepidoblastic texture, and range from medium- to coarse-grained. Migmatitic or augen structures are locally developed.
1054	Sillimanite-garnet-biotite gneiss	The sillimanite-garnet-biotite gneiss is intercalated with garnet-biotite gneisses. Staurolite has been found in sillimanite-spinel-corundum-garnet-biotite gneiss, which also contain cordierite, plagioclase, K-feldspar and quartz. Orthopyroxene and gedrite occur locally.
1055	Biotite-hornblende gneiss	The biotite-hornblende gneiss is a layered unit. The layering is defined by alternation of biotite-hornblende-rich and quartzofeldspathic layers. The relative proportions of mafic and felsic minerals also varies within the layers. The gneiss is composed mainly of hornblende, biotite, plagioclase, K-feldspar and quartz, with minor amounts of apatite, zircon, sphene and opaque minerals. Clinopyroxene are locally present. The biotite-hornblende gneiss commonly alternates with amphibolite and hornblende gneisses and in places is accompanied by layers and lenses of garnet-biotite gneisses, calc-silicate rocks, and mafic granulite lenses.
1056	Hornblende gneiss	The hornblende gneiss forms concordant hornblende-rich layers, several centimeters to several tens of centimeters thick. Unlike the amphibolite, the hornblende gneisses is layered with alternating felsic layers. These gneisses are locally associated with calc-silicate rocks. Garnet and clinopyroxene is often visible in outcrops of the gneiss.
1057	Pyroxene-biotite gneiss	The rock is dark greenish gray, medium-grained and has a granoblastic to lepidoblastic texture. The mineral assemblage comprises plagioclase, quartz, K-feldspar, biotite, hornblende, clinopyroxene ± orthopyroxene. Biotite laths display a strong preferred orientation, defining the marked gneissosity of the rock. Agmatitc blocks, ribbons and lenses of the pyroxene-biotite gneisses can be found in syenites.
1058	Amphibolite	Amphibolite commonly occurs as layers and lenses up to a few tens of meters across, which are concordant or sub-concordant with the host rocks. Discordant amphibolites occur as small bodies enclosed in gneisses, calc-silicate rocks and syenites. The amphibolite is locally massive. The principal minerals are amphibole, clinopyroxene and biotite, with subordinate amounts of plagioclase, K-feldspar and quartz. In higher grade lithologies garnet, clinopyroxene and orthopyroxene are present in the assemblages.
1059	Migmatitic gneiss	Migmatitic gneiss is characterized by the presence of agmatic, schollen, stromatic, folded, schlieren and nebulitic structures. Paleosomes of the migmatite consist mainly of the biotite-hornblende gneiss, amphibolite, and hornblende gneiss commonly with clinopyroxene; ultramafic and garnet-biotite gneiss paleosomes are rare. Neosomes of the migmatite range from leucocratic granite to granodiorite containing biotite,

		hornblende and locally clinopyroxene. These are commonly foliated due to parallel or subparallel orientation of the mafic minerals. The foliated neosomes cut the neighboring country gneisses in some places.
1060	Charnockite gneiss	Charnockite gneiss displays dark-gray color on fresh surfaces. The rock is commonly well-layered defined by alternation of felsic and more mafic bands, but is poorly foliated. Small lenses of amphibolite are common in the charnockite gneiss.
1061	Mafic granulite/mafic lenses	Mafic and ultramafic granulite occurs as lenses, up to several meters across, in country rocks. The lenses consist of clinopyroxene, orthopyroxene, amphibole, olivine, plagioclase, biotite and opaque mineral. Sapphirine may be found. This rock is poorly foliated and dark-colored due to a dark color of plagioclase, in addition to abundant mafic minerals such as garnet, clinopyroxene and orthopyroxene. A reaction zone between these lenses and the country rocks may occur where micas and amphiboles are developed.
1062	Marble, calc-silicate rock and skarn	The marble, calc-silicate rock and skarn occur mostly as concordant or subconcordant layers and lenses, up to several tens of meters across, in the country rocks. The calc-silicate rocks form small pods enclosed in the marble, bands between the marble and adjacent gneisses, and layers and lenses up to a few meters across intercalated in the biotite-hornblende gneiss and amphibolite. Calc-silicate rock is composed of wollastonite, scapolite, clinopyroxene, olivine, garnet, anorthitic plagioclase, calcite, quartz, graphite, sphene and zircon. The marble is composed of calcite with lesser amounts of scapolite, phlogopite, clinopyroxene, graphite and zircon.
1063	Granitic gneiss (variable protolith including granite, arkose)	Granitic gneiss are quartz- and feldspar-rich gneisses which may have granitic (ca. 774 Ma) and/or arkosic (ca. 800 Ma) protolith. This unit is observed in central part of the Schirmacheroasen (Joachim Jacobs; personal communications). The rock unit is bounded to the north by garnet-biotite-rich gneisses and to the south by banded gneisses rich in the mafic minerals.
1064	Augen gneiss and mylonite	Augen gneiss and K-feldspar porphyritic gneissose granite (ca. 772 Ma) of granitic composition. Cordierite, garnet and hornblende are occasionally present. Microtexture include isoclinal fold hinges defined by biotite-rich bands. The protoliths are interpreted to be granitoids, gneisses and migmatite. Thin layers of pink aplitic mylonite are locally observed. In some places (e.g. north of Cumulusfjellet), the rocks are strongly schistose, fine-grained, and have a dioritic composition.
1065	Garnet-biotite-hornblende gneiss/enderbite/gabbro	Greenschist to granulite facies rocks (980-915 Ma), predominated by amphibolite facies rocks exposed as small nunataks in the area between 14° to 21° E. Both metasedimentary and meta-igneous rocks occur. The metasedimentary rocks include highly deformed marble, calc-silicate rock and migmatitic metapelites. Garnet-bearing granitic melts are observed to intrude garnet-sillimanite gneisses at Tonyknausane. The metasedimentary rocks are intruded by felsic melts, granodiorite and gabbroic sheets. Garnet-bearing migmatites and gneisses typically contain garnet, biotite, quartz, plagioclase and K-feldspar, and opaque, apatite and zircon as accessory phases. Muscovite is generally a secondary phase. The meta-igneous rocks occur as amphibole gneisses, metavolcanics, partly retrogressed orthopyroxene-bearing orthogneisses (enderbites) and late tectonic A-type granitoids. Massive enderbitic gneisses crop out at Bergekongen, Bergtussen, Van Autenboerfjellet and Gandfluga, containing quartz, plagioclase, biotite, ortho- and clinopyroxene with accessory apatite and zircon. The enderbites contain coarse-grained leucosomes consisting of blue quartz, pink feldspar and retrogressed orthopyroxene. The enderbites are intruded by various granitic veins.
1066	Granitic gneiss and migmatite	The rocks grouped in this category are relatively homogeneous, having granitic-tonalitic-quartz monzonitic compositions. The rocks display faint gneissosity, layers and irregular domains are slightly enriched in biotite. Distinct, dark paleosomes are rarely seen. The rocks have amphibolite facies mineral assemblages, granulite facies minerals are locally observed. K-feldspar often occurs as large subidiomorphic prisms. Biotite and hornblende are major mafic minerals. Rocks with granulitic assemblages usually have a darker color than those of amphibolite facies and contain ortho- and clinopyroxene with biotite, dark feldspar and quartz. They generally have a medium- to coarse-grained granoblastic matrix with. Thin pegmatitic veins occur with sharp contact marked by hornblende-enriched zones a few centimeters wide.
1067	Calc-alkaline tonalitic gneiss	Calc-alkaline tonalitic gneiss (960-925 Ma) is found in Lunckeryggen, Mefjell and eastern Walnumfjellet. The gneisses mainly consist of plagioclase, quartz, hornblende and biotite with accessory titanite, apatite, zircon, rutile, and opaque minerals. The microtexture is granoblastic, hornblende and biotite show a preferred orientation. Hornblende and plagioclase may have a euhedral to subhedral shape.
1068	Calc-alkaline metagabbro	Calc-alkaline metagabbro (995-975 Ma) occupies a small area in southern Lunckeryggen. The metagabbro displays a weak igneous layered structure and often includes hornblendite xenoliths. The rocks are mainly composed of hornblende, plagioclase and biotite with accessory titanite, apatite, zircon, rutile and opaque minerals.. Hornblende and plagioclase grains locally show an oblong shape.

1069	Tholeiitic tonalitic gneiss	Tholeiitic tonalitic gneiss (995-975 Ma) is the main lithotype found in Nils Larsenfjellet, Widerøefjellet, and Walnumfjellet. The gneisses are composed of plagioclase, quartz, biotite and hornblende, and the accessory minerals are apatite, zircon, rutile, and opaque minerals. The rocks are have a mylonitic fabric with an E–W structural trend. Elongated hornblende and plagioclase are prominent. The tonalitic gneisses include abundant elongated mafic lenses. The mafic lenses are usually arranged parallel to the foliation of the gneisses; most have chilled margins.
1070	Granitic to granodioritic migmatite	Granitic to granodioritic migmatite (1000-750 Ma) are found in Sinnan Rocks and Tenmondai Rock.
1071	Quartzofeldspathic garnet gneiss	Quartzofeldspathic garnet gneiss (1000-750 Ma) occurs intercalated with minor mafic to ultramafic granulite layers. This rock units are found on Ongul Island, Langhovde and Skarvsnes.
1072	Granitic gneiss and gneissose granite	Granitic gneiss and gneissose granite (1000-750 Ma) are found in Langhovde and Skallen, locally the gneisses occur with an intrusive relation to the surrounding gneisses.
1073	Garnet-bearing aplitic granite	Garnet is present in a medium-grained groundmass of K-feldspar, plagioclase, quartz and biotite. Orthopyroxene may occur locally. Rare accessory phases are opaque minerals, zircon and/or muscovite. The garnet-bearing granite shows diffuse contacts against the syenites. The texture of the garnet-bearing aplitic granite is subhedral equigranular.
1074	Granitic gneiss	The granitic gneiss is leucocratic, pinkish gray to gray, fine- to medium-grained and strongly foliated. The constituent minerals are biotite, K-feldspar, plagioclase and quartz, with minor primary muscovite and zircon.
1075	Garnet-biotite gneiss	Garnet-biotite gneisses contain sillimanite, cordierite, gedrite, relict kyanite and/or relict staurolite and locally K-feldspar porphyroblasts. Thin layers of pyroxene gneiss, hornblende gneiss and biotite-hornblende gneiss are intercalated with the garnet-biotite gneiss.
1076	Biotite gneiss; partly migmatized	Biotite gneiss is partly migmatized. The unit occurs in Akebono Rock, Kasumi Rock, Niban Rock and Oku-iwa Rock.
1077	Biotite-hornblende gneiss	Biotite-hornblende gneiss, contain locally garnet (Sinnan Rocks, Akebono Rock), anthophyllite (Sinnan Rocks, Akebono Rock, Naga-iwa Rock) and cummingtonite (Sinnan Rocks).
1078	Hornblende gneiss	Hornblende gneiss occurs intercalated with pyroxene gneiss and ultramafic gneiss.
1079	Pyroxene gneiss	Pyroxene gneiss contain hornblende and/or biotite, locally garnet. Intercalated with minor mafic to ultramafic gneiss.
1080	Layered pelitic and psammitic gneiss	This unit consists mainly of pelitic and psammitic compositions and include layers of garnet-biotite gneiss, quartzofeldspathic garnet gneiss and minor bands of biotite-hornblende gneiss and pyroxene gneiss.
1081	Layered gneiss of intermediate composition	Layered gneiss of intermediate composition occurs in the granulite facies, amphibolite facies and the transitional zone. In the amphibolite facies and the transitional zones, it consists of biotite-hornblende gneiss, hornblende gneiss and minor layers of garnet-biotite gneiss and clinopyroxene-biotite amphibolite. In the granulite facies zone, it consists of pyroxene gneiss and subordinate garnet-biotite gneiss with minor mafic to ultramafic lenses.
1082	Layered gneiss of mafic composition	This unit is an alternation of almost equal amounts of garnet-biotite gneiss, pyroxene gneiss, biotite-hornblende gneiss and mafic rocks with minor calc-silicate rocks.
1083	Marble, calc-silicate rock and skarn	Marble, dolomitic marble, calc-silicate rocks and skarn, locally with wollastonite or grossular (ca. 924-1064 Ma) .
1084	Granitic gneiss and migmatite	The rocks grouped in this category (1050-1200 Ma) are relatively homogeneous, having granitic-tonalitic-quartz monzonitic compositions. The rocks display faint gneissosity, layers and irregular domains are slightly enriched in biotite. Distinct, dark paleosomes are rarely seen. The rocks have amphibolite facies mineral assemblages, granulite facies minerals are locally observed. K-feldspar often occurs as large subidiomorphic prisms. Biotite and hornblende are major mafic minerals. Rocks with granulitic assemblages usually have a darker color than those of amphibolite facies and contain ortho- and clinopyroxene with biotite, dark feldspar and quartz. They generally have a medium- to coarse-grained granoblastic matrix with. Thin pegmatitic veins occur with sharp contact marked by hornblende-enriched zones a few centimeters wide.

1085	Heterogeneous migmatite	Heterogeneous migmatite (1050-1200 Ma) may contain up to 50 vol% or more of granitic leucosome. Large areas in southern Gjelsvikfjella and western Mühlig-Hofmannfjella are composed of this rock unit. Paleosome-rich layers commonly reveal distinct banded structures. The paleosomes comprise micaceous gneisses and gneissose amphibolites. In the amphibolite, poikiloblastic hornblende contains clinopyroxene inclusions. Prismatic sillimanite are locally present in biotite-rich layers and feldspars are commonly porphyroblastic. The leucosomes have heterogeneous granitic composition and show weak irregular foliations with relatively biotite-rich parts. The migmatite include numerous veins, dikes and domains of pegmatitic and aplitic rocks.
1086	Tonalitic gneiss (Cape Hinode)	The Cape Hinode area is dominated by relatively homogeneous, medium- to coarse-grained, dark grey to purple tonalitic gneisses (ca 1000 - 1100 Ma), which are not known to occur in other parts of the Lützow-Holm Complex. The tonalitic gneiss comprise mainly plagioclase and quartz with subordinate biotite or hornblende. Minor K-feldspar, magnetite, ilmenite, zircon, apatite, monazite, titanite and allanite are present. Muscovite, chlorite, epidote and carbonates are common retrograde minerals replacing hornblende, biotite and plagioclase. The tonalitic gneiss displays a weak foliation that is folded around a large-scale, tight antiform, trending NW–SE. Probable igneous layering and lamination are occasionally observed. Small amounts of mafic to intermediate and calc-silicate metamorphic rocks occur as isolated blocks.
1087	Western granitic gneiss	The Western granitic gneiss is exposed at Jutulrøra, Brekkerista and Roerkulten, and occurs as sheet-like, concordant and sub-concordant intrusions within the Jutulrøra complex. Cross-cutting relationships are locally preserved. The Western granitic gneisses are pale pink, equigranular and medium grained, with ca. 25 % quartz and K-feldspar and plagioclase. Poikilitic hornblende and biotite define the foliation. Late biotite cross-cuts the fabric and replaces hornblende. Accessory minerals include zircon, apatite, garnet and allanite.
1088	Amphibolite	Amphibolite pre-dates the main, regional fabric and display a planar foliation parallel to S1 (sometime crosscut S1), but crosscut the compositional layering of surrounding gneisses. Amphibolite may occur as boudins and lenses in the gneisses, implying a supracrustal origin, whilst other occurrences form arrays that suggest that the protolith was a crosscutting dike. The rocks consist predominantly of hornblende, plagioclase and biotite. Garnet, quartz and clinopyroxene are present in some amphibolites, but all three of phases never coexist. Relict clinopyroxene is commonly included in hornblende. Corundum and tourmaline occur as inclusions in garnet. The hornblende defines a penetrative fabric.
1089	Sveabreen granitic gneiss	Sveabreen granitic gneiss (U-Pb zircon age of 1070-1100 Ma) occurs as tabular units, 0.1-3 km thick and up to 30 km in strike length. The gneisses are medium- to coarse-grained and strongly foliated. They are mostly monzogranitic and locally carry sillimanite and garnet. Carlsbad twins and rare composite porphyroclasts of plagioclase and K-feldspar are observed. Fine flakes of biotite along foliation planes constitute the mafic constituents (<15 %). Four main compositional variants are present: i) leucocratic, very coarse-grained, megacrystic granite, ii) darker porphyroclastic granite, iii) melanocratic granodiorite-diorite, and iv) equigranular leucogranite. The contacts between the Sveabreen gneiss and the surrounded rocks are mostly thrust bounded, although at some localities there appear to be gradational contacts with the country rock gneisses. The presence of two intersecting cleavages and folded foliations suggests that this granite pre-dates major deformation phases.
1090	Mafic sills (Borgmassivet Intrusive Suite)	Mafic sills of the Borgmassivet Intrusive Suite (~ 1107 Ma) comprise cryptically layered ultramafic sequence and mafic units. Olivine and orthopyroxene are the dominant cumulus phases in the ultramafic rocks, whereas orthopyroxene, plagioclase and clinopyroxene are the primary phases of the mafic rocks. Gabbronorite, gabbro, quartz-diorite and diorite are observed. Xenoliths of Ritscherflya Supergroup are recorded.
1091	Diorite (Borgmassivet Intrusive Suite)	Diorite sills (~ 1107 Ma) intrude rocks of Ritscherflya Supergroup. The lower part of the sills comprises a medium-grained diorite overlain by quartz diorite pegmatite. Numerous vugs, partially filled with quartz, carbonate, chlorite and/or epidote are present in the sedimentary rocks up to 3m from the contact with the sills.
1092	Straumsnutane Formation (lavas)	The Straumsnutane lava formation is a part of Ritscherflya Supergroup (~ 1130-1107 Ma). The formation is exposed in the Ahlmannryggen area, and has a total thickness of about 860 m. The Straumsnutane Formation is a highly altered porphyritic andesite with varying proportions of a glassy mesostasis. The lavas are intruded by dolerite and olivine-bearing basaltic dikes.
1093	Fasettfjellet Formation	The Fasettfjellet Formation (~ 1130-1107 Ma) forms an isolated exposure at Fasettfjellet in Borgmassivet. The Fasettfjellet Formation comprises a sequence of volcanic breccia and tuff beds (50-80 m thick), overlain by about 50 m of basaltic lava (the lower 10 m of which is pillowed). Locally, 7 m of quartz arenite is developed above the volcaniclastic units and lies immediately below the lava. Above the arenite the

		lower parts of the lava flow locally grade into hyaloclastite deposits including isolated pillows. The Fasettfjellet Formation is part of Jutulstraumen Group, Ritscherflya Supergroup. The Ritscherflya Supergroup, along with the Borgmassivet Intrusives, is represented in almost all of the nunataks in the Ahlmannryggen and Borgmassivet mountain ranges. The Ritscherflya Supergroup is divided into a lower clastic sedimentary sequence (the Ahlmannryggen Group) and an upper volcanosedimentary sequence (the Jutulstraumen Group).
1094	Istind Formation	The 340m thick Istind Formation (~ 1130-1107 Ma) consists of alternating feldspathic quartzite, agglomerate, tuff and lava flows. The Istind Formation is part of the Jutulstraumen Group, which is a part of Ritscherflya Supergroup. The Ritscherflya Supergroup, along with the Borgmassivet Intrusives, is represented in almost all of the nunataks in the Ahlmannryggen and Borgmassivet mountain ,. The Ritscherflya Supergroup is divided into a lower clastic sedimentary sequence (the Ahlmannryggen Group) and an upper volcanosedimentary sequence (the Jutulstraumen Group).
1095	Tindeklypa Formation	The 500m thick Tindeklypa Formation (~ 1130-1107 Ma) consists of agglomerate with subordinate tuff and andesitic lava flows. The Tindeklypa Formation is part of the Jutulstraumen Group which is a part of Ritscherflya Supergroup. The Ritscherflya Supergroup, along with the Borgmassivet Intrusives, is represented in almost all of the nunataks in the Ahlmannryggen and Borgmassivet mountain ranges. The Ritscherflya Supergroup is divided into a lower clastic sedimentary sequence (the Ahlmannryggen Group) and an upper volcanosedimentary sequence (the Jutulstraumen Group).
1096	Raudberget Formation	The Raudberget Formation (~ 1130-1107 Ma) is a uniform succession of fine-grained red arenites and siliceous red argillites with thin layers of mudchip breccia and thin sheets of quartz pebble conglomerate. The Raudberget Formation is part of Ahlmannryggen Group, Ritscherflya Supergroup. The Ritscherflya Supergroup, along with the Borgmassivet Intrusives, is represented in almost all of the nunataks in the Ahlmannryggen and Borgmassivet mountain ranges. The Ritscherflya Supergroup is divided into a lower clastic sedimentary sequence (the Ahlmannryggen Group) and an upper volcanosedimentary sequence (the Jutulstraumen Group).
1097	Jekselen Formation	The Jekselen Formation (~ 1130-1107 Ma) is described as detached blocks (xenoliths) of steeply dipping arenaceous sediment in diorite of the Borgmassivet intrusive. The occurrence of this formation is restricted to the type locality, Jekselen nunatak, and isolated exposures at Tindeklypa. The sequence consists predominantly of calcareous sandstone units with well-developed crossbedding, and lesser amounts of shale and conglomerate. The Jekselen Formation is part of Ahlmannryggen Group, Ritscherflya Supergroup. The Ritscherflya Supergroup, along with the Borgmassivet Intrusives, is represented in almost all of the nunataks in the Ahlmannryggen and Borgmassivet mountain ranges. The Ritscherflya Supergroup is divided into a lower clastic sedimentary sequence (the Ahlmannryggen Group) and an upper volcanosedimentary sequence (the Jutulstraumen Group).
1098	Høgfonna Formation	The Høgfonna Formation (~ 1130-1107 Ma) is part of Ahlmannryggen Group, Ritscherflya Supergroup. The Høgfonna Formation consists of feldspathic quartzite, shale, jasper-bearing conglomerate and calcareous-jasper-bearing arenaceous sediments with red beds and tuff layers occurring towards the top of the formation. The Ritscherflya Supergroup, along with the Borgmassivet Intrusives, is represented in almost all of the nunataks in the Ahlmannryggen and Borgmassivet mountain ranges. The Ritscherflya Supergroup is divided into a lower clastic sedimentary sequence (the Ahlmannryggen Group) and an upper volcanosedimentary sequence (the Jutulstraumen Group).
1099	Schumacherfjellet Formation	The Schumacherfjellet Formation (~ 1130-1107 Ma) consists of a sequence of alternating light colored arenites and dark colored argillites. The formation crops out at Schumacherfjellet, Grunehogna, Lyftingen, Kjølrabbane, Styrbordsknattane, Ovenuten, Flårjuven, Flårjuvnutane and Klumpane. The Schumacherfjellet Formation is part of Ahlmannryggen Group, Ritscherflya Supergroup. The Ritscherflya Supergroup, along with the Borgmassivet Intrusives, is represented in almost all of the nunataks in the Ahlmannryggen and Borgmassivet mountain ranges. The Ritscherflya Supergroup is divided into a lower clastic sedimentary sequence (the Ahlmannryggen Group) and an upper volcanosedimentary sequence (the Jutulstraumen Group).
1100	Framryggen Formation	The Framryggen Formation (~ 1130-1107 Ma) crops out at the north-western part of the Borgmassivet, and apart from the type locality (Framryggen nunatak) the formation occurs at Trioen, Framrabben, and Borga. The formation comprises a succession of alternating mudstones and greywackes, and although there is no exposure of the upper or lower contacts, it is inferred to have a conformable relationship with both the underlying Pyramiden, and the overlying Høgfonna Formation. The Framryggen Formation is part of Ahlmannryggen Group, Ritscherflya Supergroup. The Ritscherflya Supergroup, along with the Borgmassivet Intrusives, is represented in almost all of the nunataks in the

		Ahlmannryggen and Borgmassivet mountain ranges. The Ritscherflya Supergroup is divided into a lower clastic sedimentary sequence (the Ahlmannryggen Group) and an upper volcanosedimentary sequence (the Jutulstraumen Group).
1101	Pyramiden Formation	The Pyramiden Formation (~ 1130-1107 Ma) is the lower base of the Ritscherflya Supergroup and consists essentially of thin and evenly bedded feldspathic greywacke alternating with dark grey siltstone. The Ritscherflya Supergroup, along with the Borgmassivet Intrusives, is represented in almost all of the nunataks in the Ahlmannryggen and Borgmassivet mountain ranges. The Ritscherflya Supergroup is divided into a lower clastic sedimentary sequence (the Ahlmannryggen Group) and an upper volcanosedimentary sequence (the Jutulstraumen Group).
1102	Banded orthogneiss (Kirwanveggen complex)	Banded orthogneiss (Kirwanveggen complex) comprises amphibole-biotite ± garnet gneiss and quartzofeldspathic gneiss intruded by amphibolite dikes and banded pink-grey leucogneiss with amphibolite interlayers and boudins. Early mafic schlieren are observed within the more leucocratic parts of the unit.
1103	Migmatite (Kirwanveggen complex)	Migmatite (Kirwanveggen complex) is a fine- to medium-grained melanocratic rock, with leucosomes and melanosomes defining the gneissic foliation. The major mineralogy comprises biotite, feldspar, quartz, amphibole and ± garnet. The gneiss is often highly tectonised. Calc-silicate and amphibolite boudins are often observed within the regional foliation of the migmatite. Vein-network of migmatitic gneisses are observed.
1104	Augen gneiss (Kirwanveggen complex)	The augen gneiss (Kirwanveggen complex) occurs as large concordant tabular bodies, which intrude surrounded banded gneiss and orthogneisses. The unit comprises quartz, feldspar, biotite ± garnet ± hornblende and has a distinctive augen texture defined by K-feldspar porphyroclasts. The augen gneiss enclose remnants of charnockite and large amphibolite bodies. Biotite-rich varieties are common and evidence for localized partial melting and migmatization is widespread.
1105	Quartzitic mylonite (Kirwanveggen complex)	Quartzitic mylonite (Kirwanveggen complex) is exposed at the Gavlpiggen, the thickness is about 220 m. Another outcrop is cropping out at Klakknabben, where at least 15 m thick quartzite mylonites intercalated with mica schists. Petrographically, the mylonites are almost pure quartzites, except from some few grains of plagioclase and a small amount of white mica (sericite).
1106	Laudalkammen granite (Kottas Terrane)	This unit includes coarse-grained, red granite, diorite, grey fine-grained granite veins and pegmatites. The red granite forms a large sheet-like body which locally crosscuts the layering in the older rocks at its southern margin. It is characterized by euhedral, pink K-feldspar crystals, other phases are quartz, plagioclase and minor biotite. At Laudalkammen the granite is intruded by diorite sills. The pegmatites are composed of microcline crystals intergrown with quartz, biotite and minor muscovite, garnet and accessory zircon. They clearly cut the main regional penetrative (S2) foliation. The Laudalkammen granite represents the youngest Grenville-aged igneous intrusion of the Kottas terrane.
1107	Buråsbotnen augen gneiss (Kottas Terrane)	The Buråsbotnen augen gneiss comprises granite and granodiorite gneiss. Individual sheets measure up to 400 m in thickness, intruded sub-parallel to the layering of the metavolcanosedimentary succession and the Vikenegga tonalite of the Kottas Terrane. The gneisses are typically composed of pink K-feldspar augen set in a fine- to medium-grained matrix of quartz, K-feldspar, oligoclase, green biotite and green hornblende with accessory epidote, sphene and zircon. The darker granodioritic variety of the Buråsbotnen augen gneisses contain more hornblende, biotite and sphene.
1108	Undifferentiated metavolcanosedimentary rocks (Kottas Terrane)	The metavolcanosedimentary rocks is the oldest supracrustal sequence of the Kottas terrane, and is dominated by medium-grained banded grey gneisses, with broadly tonalitic composition. The supracrustals crop out at Leabotnen, Buråsbotnen, Lütkennupen and Arntzenrustene. They are interlayered on a centimeter- to decimeter-scale with leucocratic quartz–feldspar gneiss and amphibolite, and minor garnet-mica gneiss and calc-silicate rocks. The grey tonalitic gneiss contain plagioclase phenocrysts up to 1 cm in size, set in a medium- or fine-grained matrix of quartz, plagioclase, biotite and hornblende. Retrograde reactions include saussuritization of plagioclase, and localized growth of calcite and epidote. The subordinate, interlayered pink gneiss is fine- to medium-grained with rhyolitic composition, and contain small quantities of biotite as the only mafic phase. Layers and lenses, up to a few meters in thickness, of garnet–biotite–plagioclase gneiss, graphite- and garnet-bearing quartzite, calc-silicate rock, tremolite-forsterite marble and dolomitic marble are present. The grey and pink gneisses are considered to represent metavolcanic/volcaniclastic rocks of dacitic/andesitic and rhyolitic composition. Fine-grained grey felsic gneiss with euhedral to subhedral plagioclase phenocrysts is interpreted as pyroclastic rocks.
1109	Vikenegga tonalite (Kottas Terrane)	The Vikenegga tonalite is the oldest unit of the Kottas Terrane, and consists of sheet-like bodies of an amphibolite-quartz diorite-tonalite-trondhjemite-granodiorite sequence. The mafic and probably the oldest members of the Vikenegga tonalite include foliated occellar quartz

		diorite, which is composed of hornblende, plagioclase and biotite with accessory sphene, apatite and zircon. The rock unit also includes grey, coarse-grained tonalitic gneiss. The felsic members of the Vikenegga tonalite comprise thin sheets of leucocratic trondhjemite.
1110	Granulite (Vardeklettane Terrane)	The western nunatak of Vardeklettane is composed of fine- to medium-grained leucogranite gneiss which is composed of quartz, plagioclase, biotite, K-feldspar and garnet. Numerous mafic enclaves, veins and patches of greenish charnockite are present in the leucogranite. They contain granulite-facies mineral assemblages with clinopyroxene, orthopyroxene, plagioclase and hornblende. The nunatak of eastern Vardeklettane is structurally and lithologically different from the western nunatak. The younger gneiss is a dark-grey to black, weakly foliated quartz monzonite. Large patches of graphite are sporadically present. The monzonite intrudes an older porphyritic granite orthogneiss. The latter is a coarse-grained, foliated granitic gneiss with K-feldspar megacrysts and contains large xenolithic rafts of leucogranite/charnockite similar to the western Vardeklettane rocks. The oldest rocks are represented by an approximately 400 m thick succession of metapelites and quartzites with two minor ultramafic enclaves.
1111	Banded gneiss (Jutulrøra complex)	Banded gneiss (Jutulrøra complex) is interlayered with the lower part of the quartz-feldspar gneiss of the Jutulrøra complex and is distinguished from the latter by its strong compositional, meter-scale layering. The layers consist of felsic gneiss, amphibolite and subordinate Mg-rich mafic rocks, calcareous and semipelitic gneiss. The main constituents of mafic layers are hornblende and plagioclase with subordinate clinopyroxene, garnet, quartz, biotite, chlorite and epidote. The rocks display a fine- to medium-grained, granoblastic texture. The foliation is defined by hornblende, which is locally overgrown by biotite. Felsic layers are fine- to medium-grained, granoblastic quartzofeldspathic rocks. Planar fabrics are defined by garnet, hornblende and biotite with relict aluminosilicates. The interlayered concordant character and siliceous nature of the rocks suggest either a volcanoclastic or a sedimentary origin. Mg-rich mafic bands are pale green and display a weak schistose texture. Relict olivine and diopside are observed in some samples. Calc-silicate rocks are locally present.
1112	Quartz-feldspar gneiss (Jutulrøra complex)	Quartz-feldspar gneiss (Jutulrøra complex) is felsic to intermediate rocks which are medium-grained, equigranular and homogeneous with respect to mineralogy. Typical assemblages comprise quartz, plagioclase, K-feldspar, hornblende, biotite and epidote with accessory apatite, zircon, titanite and allanite. The foliation is defined by hornblende which is partially overgrown by biotite and epidote.
1113	Marble and calc-silicate rock (Fuglefjellet complex)	Marble and calc-silicate rock (Fuglefjellet complex) display a weakly foliated, fine- to coarse-grained granoblastic texture. Marble contain the mineral assemblage calcite, dolomite, tremolite, ± talc, ± phlogopite, ± serpentine and ± brucite. Serpentine and brucite aggregates are formed after olivine. The mineralogy of the calc-silicate rocks comprises clinopyroxene, hornblende, plagioclase, quartz, ± sphene, ± scapolite, ± K-feldspar, ± calcite, ± biotite, ± epidote, ± chlorite. Centimeter-scale banding is defined by alternating diopside- and hornblende-rich layers.
1114	Pelitic gneiss (Fuglefjellet complex)	Pelitic gneiss (Fuglefjellet complex) is similar to the banded gneiss of the Jutulrøra gneiss complex, and include quartzofeldspathic, mafic and Mg-rich gneiss. The quartzofeldspathic gneiss exhibits a medium-grained granoblastic texture, and contain plagioclase, K-feldspar, biotite, hornblende, clinopyroxene and garnet. The presence of deformed conglomerates and quartz-rich lithologies suggest a sedimentary origin for parts of the quartzofeldspathic sequence. The mafic gneiss is medium-grained, granoblastic and contain hornblende, biotite, plagioclase ± clinopyroxene ± garnet ± epidote ± chlorite. The Mg-rich mafic gneiss contains serpentinized olivine, amphibole, phlogopite and talc. The gneissosity is defined by phlogopite and late serpentine. The Mg-rich rocks are interpreted to have an ultramafic igneous origin.
1115	Quartz-feldspar gneiss (Rootshorga complex)	Quartz-feldspar gneiss (Rootshorga complex) comprises quartz, feldspar and small amounts of biotite and garnet. Preservation of cross-bedding and metaconglomerate indicates a sedimentary origin for the unit. The rocks are granular to granoblastic, with highly strained ribbons and polygonised leaves of quartz. Abundant microcline is rarely perthitic. Garnet commonly forms atolls or thin, irregularly curved stringers. Quartz-rich gneisses are distinctly banded with local magnetite-rich laminae. The protolith is interpreted to be immature arenites and argillites. Metamafic and calc-silicate gneiss are found as enclaves.
1116	Pelitic and semi-pelitic gneiss (Rootshorga complex)	Pelitic and semi-pelitic gneiss (Rootshorga complex) is fine- to medium-grained, banded and commonly display a migmatitic structure; they contain mafic and melanocratic lenses. Typical assemblages comprise quartz, plagioclase, K-feldspar, biotite, sillimanite, cordierite, garnet, hornblende and magnetite. Secondary chlorite can be observed. Gneisses showing gradational variations between the pelitic and quartzofeldspathic gneiss are medium- to coarse-grained, equigranular, with porphyroblasts of plagioclase and garnet. They contain hornblende with inclusions of relict augite, hypersthene and plagioclase. Their bulk compositions range from tonalitic to dioritic. Mafic and calc-silicate gneiss are found as inclusions in the pelitic and semi-pelitic gneisses.

1117	Granitic gneiss (Rootshorga complex)	Granitic gneiss (Rootshorga complex) is a pre-tectonic (ca. 1131 ± 25 Ma) metagranitoid that occur as conformable units, irregularly shaped bodies and deformed layers/veins and leucosomes. The presence of dark-grey andesine porphyroclasts and xenocrystic garnets is notable. Mafic enclaves occur as amphibolite and biotite-garnet gneiss. The granitic gneiss exhibits a well-developed foliation, locally as a composite S-C fabric or double cleavage. No pre-existing foliation has been seen in any of the enclaves. The gneisses are characterized by normally zoned plagioclase, microperthitic K-feldspar porphyroclasts and myrmekite developed around the porphyroclastic feldspars. Biotite occurs predominantly in pressure shadows. Garnet is a common accessory phase, both as irregular relicts and small idiomorphic grains in plagioclase. Rare hornblende is associated with biotite. Tourmaline (schorlitic), zoisite, allanite, magnetite and titanite are present as accessory phases.
1118	Cottontoppen granite (Sivorg Terrane)	The Cottontoppen granite represents the youngest plutonic rock in the Sivorg Terrane. It crops out at Cottontoppen, Worsfoldfjellet, Ryghnuten and Sirinuten. The granite is a leucocratic, fine- to medium-grained muscovite and garnet-bearing granite that is commonly associated with pegmatites. Plagioclase is strongly saussuritized. Late muscovite appears to overgrow the fabric. At Cottontoppen the intrusive contact crosscuts the metamorphic fabrics in the country rock gneisses.
1119	Refsdahlbrekka granodiorite (Sivorg Terrane)	The Refsdahlbrekka granodiorite crops out at Ryghnuten and Sirinuten where it appears to have a partly refolded contact with felsic metavolcanic rocks. At Ryghnuten, the marginal zone of the intrusion contains numerous mafic xenoliths. The granodiorite intrudes both the Månesigden porphyritic granite and the Juckeskammen orthogneiss. Cuspate-lobate contact relationships between the granodiorite and the Månesigden porphyritic granite indicate that the Refsdahlbrekka granodiorite intruded before the Månesigden granite had completely solidified.
1120	Worsfoldfjellet monzonite (Sivorg Terrane)	The Worsfoldfjellet monzonite (1080-1045 Ma) crops out at Worsfoldfjellet and Cottontoppen. The monzonite has white K-feldspar phenocrysts set in a dark grey matrix of plagioclase, biotite, garnet. Accessory phases are apatite and zircon. Plagioclase is commonly saussuritized. Some early biotite flakes display sagenitic texture, whereas secondary biotite lacks such exsolution features.
1121	Månesigden porphyritic granite (Sivorg Terrane)	The Månesigden porphyritic granite (1100-1050 Ma) is the most voluminous granitoid intrusion in Heimefrontfjella, and is exposed over large parts of Tottanfjella and Sivorgfjella. Large outcrops appear at Johsonhogna, Månesigden and Wrighthamaren. Mylonitic equivalents of the Månesigden porphyritic granite can be seen at Bieringmulen. The Månesigden porphyritic granite contains K-feldspar megacrysts up to 15 cm in length, set in a coarse-grained matrix of variably saussuritized plagioclase, quartz, biotite, garnet and accessory hornblende, titanite, apatite and zircon.
1122	Cottontoppen diorite (Sivorg Terrane)	Cottontoppen diorite is medium-grained, equigranular and crops out at Cottontoppen. It is composed of plagioclase, quartz, biotite, garnet and accessory apatite and zircon. Quartz ocelli, up to 5 mm in size, suggest that the intrusion has a hybrid nature.
1123	Granodiorite (Fish Gneiss-Sivorg Terrane)	The granodiorite (Fish Gneiss - 1080 Ma - Sivorg Terrane) is a medium-grained foliated granodiorite that crops out at Haldorsentoppen. The large abundance of xenoliths (amphibolite, diorite, layered gneiss) is a characteristic feature of the granodiorite.
1124	Undifferentiated metavolcanosedimentary rocks (Sivorg Terrane)	Approximately half of the exposed basement of the Sivorg Terrane is made up of an, amphibolite grade metavolcanosedimentary succession. The successions are compositionally layered, consisting of paragneiss, schist, quartzite, marble and metapelite, pointing towards sedimentary protoliths. A distinct suite of “bimodal” banded gneiss is composed of a sequence of interlayered felsic granitic gneiss and amphibolite with sharp lithological boundaries. The bimodal gneisses are thought to represent metavolcanic rocks. The felsic part is characterized by predominantly fine- to medium-grained, pink granoblastic leucogranitic gneiss that is interlayered on a cm to 100 m-scale with mafic gneiss (amphibolites). The pink leucogneisses have broadly granitic composition with minor amounts of hornblende, garnet, epidote and titanite. The mafic layers consist of fine- to medium-grained amphibolite and hornblende-biotite gneiss. The mineralogy includes hornblende, plagioclase and biotite with minor amounts of quartz, epidote, titanite, garnet and other accessory minerals. Intermediate metavolcanic rocks consist of plagioclase, quartz, biotite and hornblende. Paragneiss is fine- to medium-grained and is composed of quartz, plagioclase, K-feldspar, biotite, ± muscovite, garnet, hornblende and sillimanite. Mica schist is interlayered with the paragneiss and is fine- to coarse-grained and consist of biotite, plagioclase, K-feldspar, quartz, ± garnet, kyanite, and staurolite. Marble occurs as thin layers interbedded with paragneiss and mica schist and is composed of calcite with accessory muscovite, titanite and opaque minerals. They are closely associated with calc-silicate rocks.

1125	Metavolcanic rocks (Sivorg Terrane)	A distinct suite of “bimodal” banded gneiss is composed of a sequence of interlayered felsic granitic gneiss and mafic amphibolite with sharp lithological boundaries. These bimodal gneisses are thought to represent metavolcanic rocks. The part is characterized by predominantly fine- to medium-grained, pink granoblastic, leucogranitic gneiss that are interlayered on a cm to 100 m-scale with mafic gneisses (amphibolites).
1126	Metasedimentary rocks (Sivorg Terrane)	This unit is compositionally layered, consisting of paragneiss, schist, quartzite, marble and metapelite, pointing towards sedimentary protoliths.
1127	Juckeskammen orthogneiss (Sivorg Terrane)	The coarse-grained Juckeskammen orthogneiss makes up large parts of Juckeskammen and Bowrakammen. It is a relatively felsic granitic augen gneiss, in which large K-feldspar phenocrysts are set in a medium- to coarse-grained matrix of biotite, quartz and recrystallized plagioclase, with accessory apatite, zircon and opaque minerals. Its highly deformed nature, relative to the other granitoids in the Sivorg Terrane, suggests that it is one of the older intrusive units.
1128	Annandagstoppane gabbronorite	Annandagstoppane gabbronorite (~ 1200 Ma) is orthocumulates-, medium-grained gabbronorite with minor anorthosite. Cumulus crystals are plagioclase, orthopyroxene and clinopyroxene. Dikes and sills of quartz diorite, basalts, fine- to medium-grained dolerite and albitites intrude the gabbronorite.
1129	Annandagstoppane granite and granodiorite	The Annandagstoppane granite and granodiorite are fine-grained, leucocratic and intruded by meter-scale garnet-bearing pegmatite dikes with sharp intrusive contacts. The crystallization age of the granite and granodiorite is determined to be 3067 ± 8 Ma (U-Pb zircon). Inherited zircon grains with age of 3433 ± 8 Ma were found. Annandagstoppane granite and granodiorite are part of the Grunehogna Craton.