DANMARKS OG GRØNLANDS GEOLOGISKE UNDERSØGELSE RAPPORT 2019/26

Prospecting for dimension stone in South Greenland 2018

Christian Knudsen & Per Kalvig

GEOLOGICAL SURVEY OF DENMARK AND GREENLAND
DANISH MINISTRY OF CLIMATE, ENERGY AND UTILITIES

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Contents

Abstract

In the period 21st August to 31st August 2018 fieldwork in the Gardar Alkaline Province. The work was based on the ship Johnstrup aiming at locating rocks that can be quarried and marketed as dimension stone for export. The main focus was on the Nunarssuit Pen-insula and syenites with iridescence. Syenitic pegmatite with iridizing feldspar (moonstone) was found as fairly narrow veins in the Kuunaat Intrusion East of Arsuk probably too small to be attractive for mining. Samples were also collected from a meta-conglomerate, the Helene Granite, the Malenefjeld Granite, Amazonite, the Nunarssuit syenite, large feldspar anorthosites, Narssaq quartzite and Syenitic dykes on Tugtutôq Island.

The northern coast of Amitsuarssuaq Fjord on the Western part of Nunarssuit Peninsula has larvikite characterized by feldspar with iridescence. The outcrops are also characterized by very few fractures and these rocks form the ideal potential dimension stone. It is recommended that the quality of the larvikite present on Nunarssuit is investigated further before introducing potential investors to the area.

The focus of these investigations should be on:

1. Acquiring drillcore to a depth of ca. 50 cm.
2. Prospect for localities with optimal iridescence in the feldspar.
3. Measure the density and orientation of fractures.

The Narsaq quartzite contain a fairly high density of fractures and it will not be possible to produce traditional dimension stone blocks. However, smaller blocks can be quarried for production of smaller items.

1 Introduction

The Ministry of Mineral Resources in Greenland (MMR) and the Geological Survey of Denmark and Greenland (GEUS) agreed (2017) to reinitiate investigations on the potential for commercial dimension stone projects in South Greenland. The project encompasses the following phases:

- Phase 1: Desk-top study with the aim to assess the key economic parameters for a dimension stone quarry in Greenland (Quarter 4, 2017)
- Phase 2: Fieldwork in South Greenland, with the aim to identify localities considered to carry the best commercial dimension stone quarry potential (Fieldwork and follow-up Q3+4, 2018).
- Phase 3: Field-excursion: to introduce potential investors to most promising localities (Preparation Q1; Field excursion Q3, 2019).

This report summarizes field activities related to Phase 2.

1.1 Objectives

The main objective is to locate rocks that can be quarried and marketed as dimension stone aimed for the export markets. To qualify for this such rocks must have an attractive colour, texture and structure with a minimum of fractures, and be located near the coast allowing easy shipment.

1.2 Background

For logistical and budget reasons field activities were limited to Southwest Greenland, hosting among other interesting rocks, granites and syenites of the Nunarssuit Complex, part of the Gardar Alkaline Province.

The Nunarssuit Complex measures ca. 45 x 25 km^2 is the largest igneous complex tied to the Gardar Alkaline Province (Emeleus & Upton 1976). The main part of this complex is constituted by coarse-grained, homogeneous augite syenites, but large homogeneous granites often with low fracture density also cover large areas. The Gardar intrusions are Mesoproterozoic (1,35 – 1,13 Ga) and equivalent to the c. 1.2 Ga old Nain Plutonic Suit in Labrador, known for hosting iridizing feldspars and potential for attractive dimension stones. The Nunarssuit Complex syenites also share many features with the larvikites in the Oslo Rift, sourcing substantial export volume of iridescence dominated dimensions stone blocks (Heldal *et al.* 2008).

The geological background of the present work is further described in Kalvig & Knudsen (2018). Previous work is described in Gothenborg, Garde & Bugnon (1994), Kalvig, Knudsen & Rasmussen (2002) and Rasmussen & Olsen (2003), Rasmussen (2003).

The present report describes the fieldwork in August 2018.

2 Methodology

The visited area is dominated by glacial polished rock surfaces, which makes sampling difficult. To be able to sample outcrops of rock without natural fractures GEUS developed a small portable rig that can be mounted on the outcrop (Figure 1 & 2). The drill is gasoline driven and the cores are 7.5 cm in diameter and up to 10 cm long. To mount the drill on the rock, a small hole (2 cm in diameter) was drilled using an electric percussion drill (Fig. 1a). An expansion bolt was placed in the hole (Fig. 1b) and a screw placer in this bolt (Fig. 1 c). The rig was fixed to the rock by tightening the bolt and subsequently by tightening the 4 distance screws (Fig. 1 d).

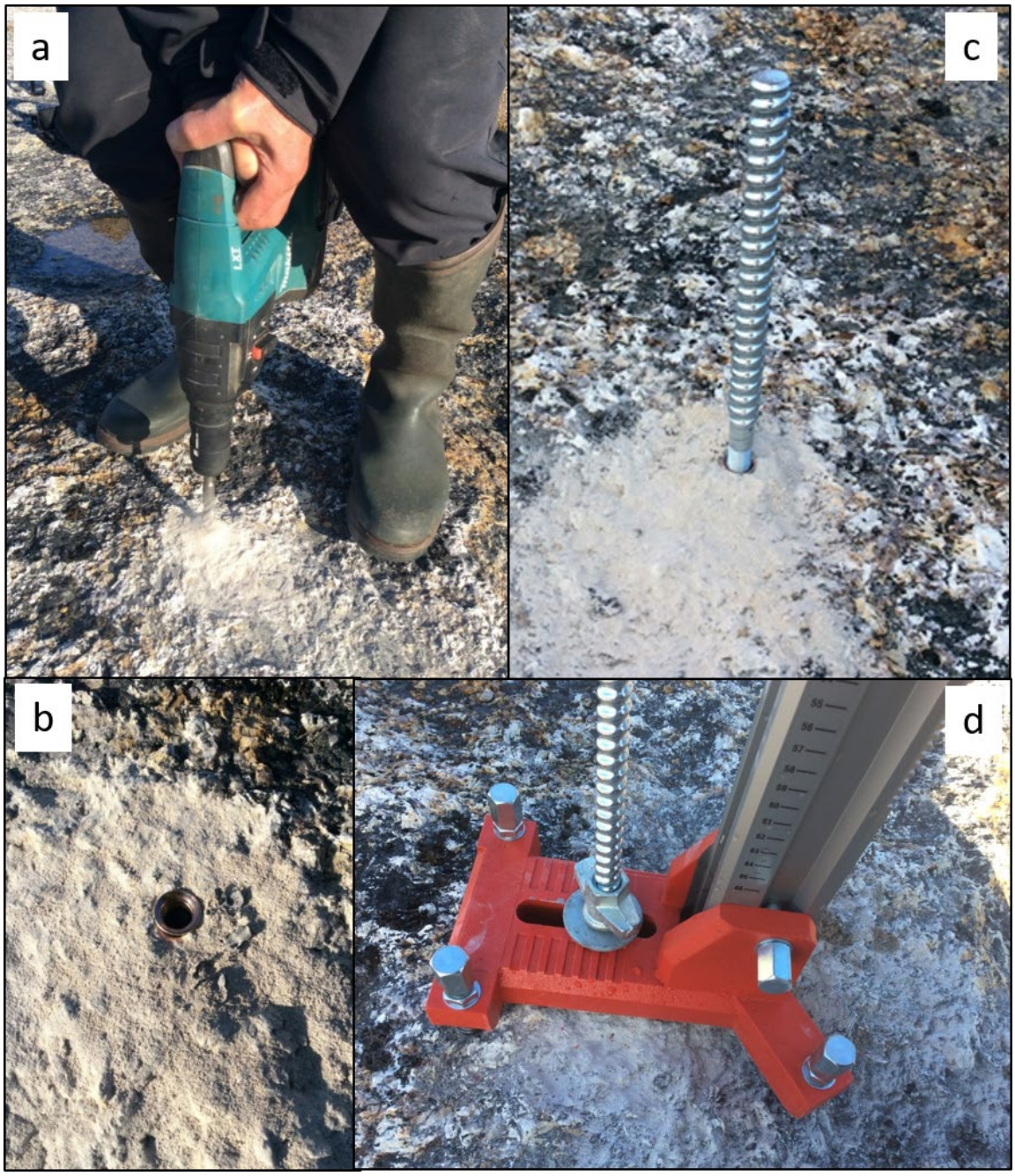

Figure 1 *Drilling of pilot hole with electric percussion drill and fixing the rig to the outcrop.*

Figure 2 *Small rig for drilling core in glacially polished surfaces (a), and the resulting drill-core sample (b).*

3 Fieldwork

The fieldwork was conducted in the period 21st August to 31st August 2018 by Per Kalvig and Christian Knudsen, GEUS, Arent Heilmann, MMR, and Professor Giorgio Martinotti, Italy. The fieldwork was based on the ship Johnstrup starting in Narsarussuaq and ending in Qaqortoq.

On September 1st a meeting was held with Ole Christiansen, representing Kujalleq Kommune, with the aim to brief the municipality and small-scale license holders about the dimension stone project findings and opportunities this sector may provide. An information meeting was organized on September 3rd, but regrettably, none of local stakeholders showed up.

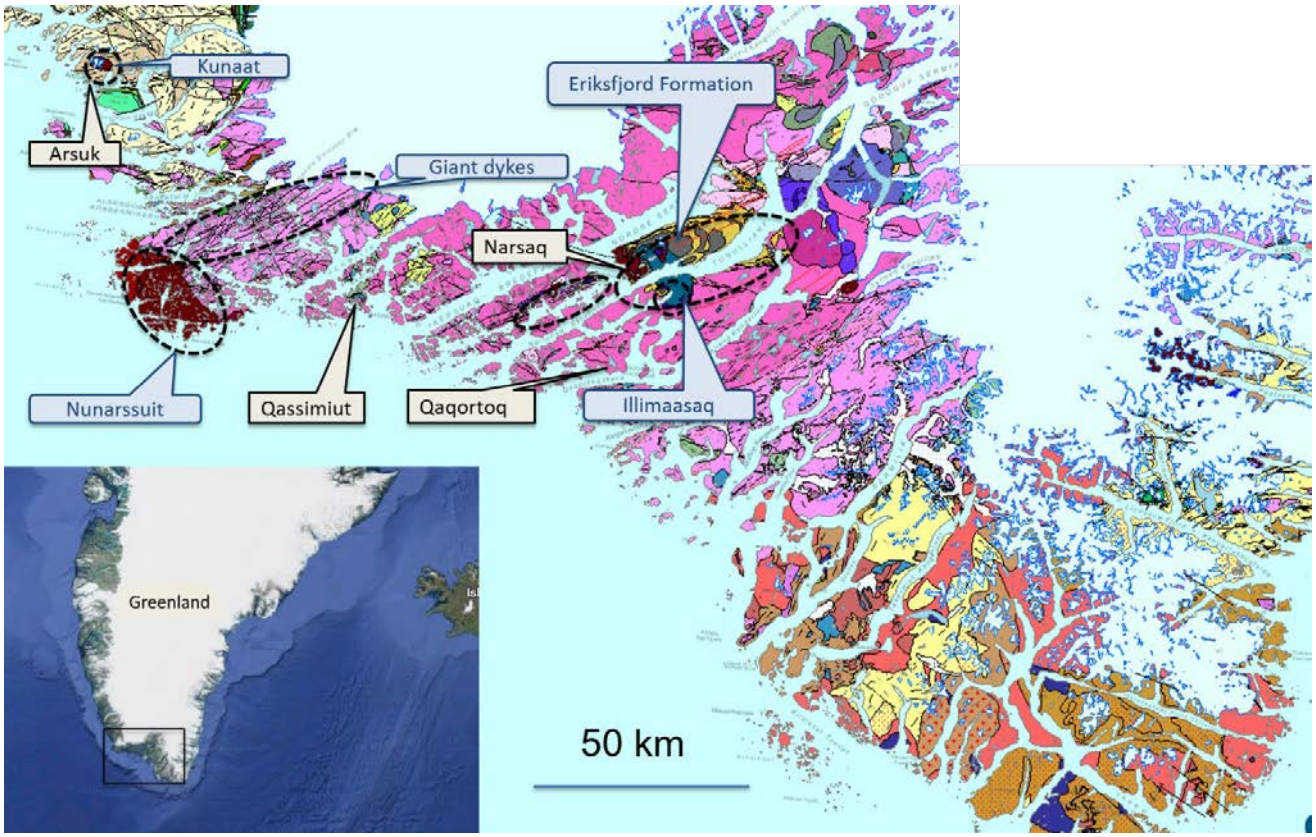

Figure 3 *Geological map of the field area with key areas indicated.*

3.1 Syenite – Kûngnât Complex

The Kûngnât Complex (Figure 4) is part of the Gardar Alkaline Province, located *c.* 4 km northeast of the village of Arsuk. The intrusion is seen to stand out as a high mountain (Figure 5) with low fracture density (Figure 6). In the eastern part of the intrusion, Upton (pers. com. 2018) found feldspar with iridescence tied to late pegmatites. These iridizing feldspar pegmatites were found (Figure 7 & 8) and sampled. However, the thickness of the individual pegmatites with iridizing feldspar was not found to exceed 1 m in thickness.

Upton (1960) note that the feldspars of the Ring-Dyke (Figure 4) display strong zonation not very different from the Larvikite (Heldal *et al.* 2008). Accordingly, the Kuunaat intrusion is also an obvious target for exploration for iridizing feldspar and it was found in pegmatite's near the SE margin of the intrusion (Figure 7). In southern Norway larvikite is mined, characterized by bright optical interference color (iridescence) seen in certain varieties due to optical refraction in the exsolution pattern of alternating orthoclase (K-feldspar) and albite (plagioclase) lamellae. The age of the intrusions is Permian and is part of the initial stages of rifting in the Oslo Graben. Therefore similar to the tectonic setting of the Gardar, which is also tied to the initial stages of (failed) rifting. The bulk of the feldspar in the larvikite is ternary, with compositions in the range $An_{4–30,}$ $Ab_{58–82}$ and $Or_{3–35}$ (Heldal *et al.* 2008).

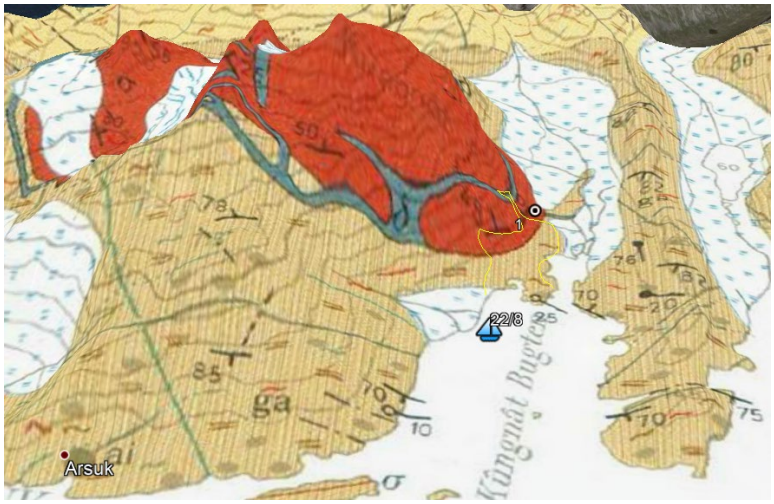

Figure 4
Geological map of the Kuunnaat intrusion (Upton et al 1985); path follows the SE border of the intrusion.

Pattern of main fracture systems (direction). NS, 50º N, 310º N; there are large domains with very low fracture density, suitable for quarrying. Samples of blocks of greenish grey syenite, observed.

Figure 5 *Kuunaat mountain seen from south (ca. 1400 m high). Note the low density of fractures in the mountain.*

Figure 6 *Low fracture density in coarse-grained syenite at Kuunaat.*

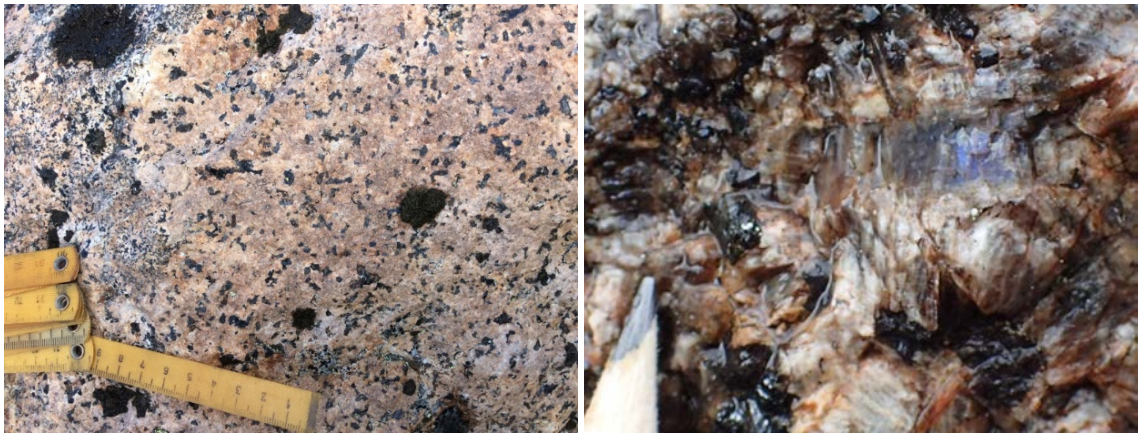

Figure 7 *Coarse-grained syenite, from the Kuugnaat intrusion (left). Late pegmatite in syenite with iridescent (light blue) feldspar (right).*

3.2 Meta-conglomerate - Tartoq Supracrustals

The Archaean basement gneisses is in the Arsuk area overlain by the Tartoq Supracrustals (Figure 8). The basement gneiss has ages ranging from 2980-3500 Ma and Tartoq Supracrustals are assumed to be late Archaean, deposited between *c.* 2500 and 3000. The Tartoq Supracrustals (Higgins and Bondesen, 1966) consists of meta-volcanics and metasediments, they are several kilometers thick and rest unconformably upon the Archaean gneisses with a basal conglomerate

which is the one of potential interest as dimension stone. The metamorphic grade is in the greenschist facies. Sample 521503 represent this deformed basal conglomerate (Figures 9 and 10).

Figure 8 *Localities visited: Meta-conglomerates and –sandstones with preserved sedimentary structures.*

Figure 9 *Basal conglomerate, Tartoq Supracrustals, locality 9,in the Qornoq Fjord ESE of Arsuk.*

The degree of fracturing of the meta-conglomerates is quite high, and it will be difficult to produce standard size blocks, although the colors and the textures seem quite attractive. The main fracture systems are (direction): 20ºN, 60ºN, 100ºN & 150ºN.

Figure 10 *Ripple-marks in sandstone; Tartoq Supracrustals in Qornoq Fjord. Locality 9.*

Figure 11 *Green epidote-rich layers alternate with grey to violet layers.*

Figure 12 *Conglomerate cut by granite. Tartooq Supracrustals in Qornoq Fjord. The fracture pattern at the locality is dominated by on set perpendicular to the bedding and one parallel to the bedding.*

3.3 Granite - Helene Granite Intrusion, Gardar

The Helene Granite is part of the Nunarssuit Complex and constitutes the Western part of Nunarssuit peninsula (Figure 13) cropping out both North and South of the Torssukatak Fjord.

The Helene Granite is a fayalite-hedenbergite granite (Harry & Pulvertaft, 1963) and shows only little mineralogical variation hosting cm large semi-rectangular K-feldspar (Figure 14). The northern part of the Helene Granite is characterized by very few – dominantly EW – fractures, allowing production of large dimension stone blocks (Figure 15).

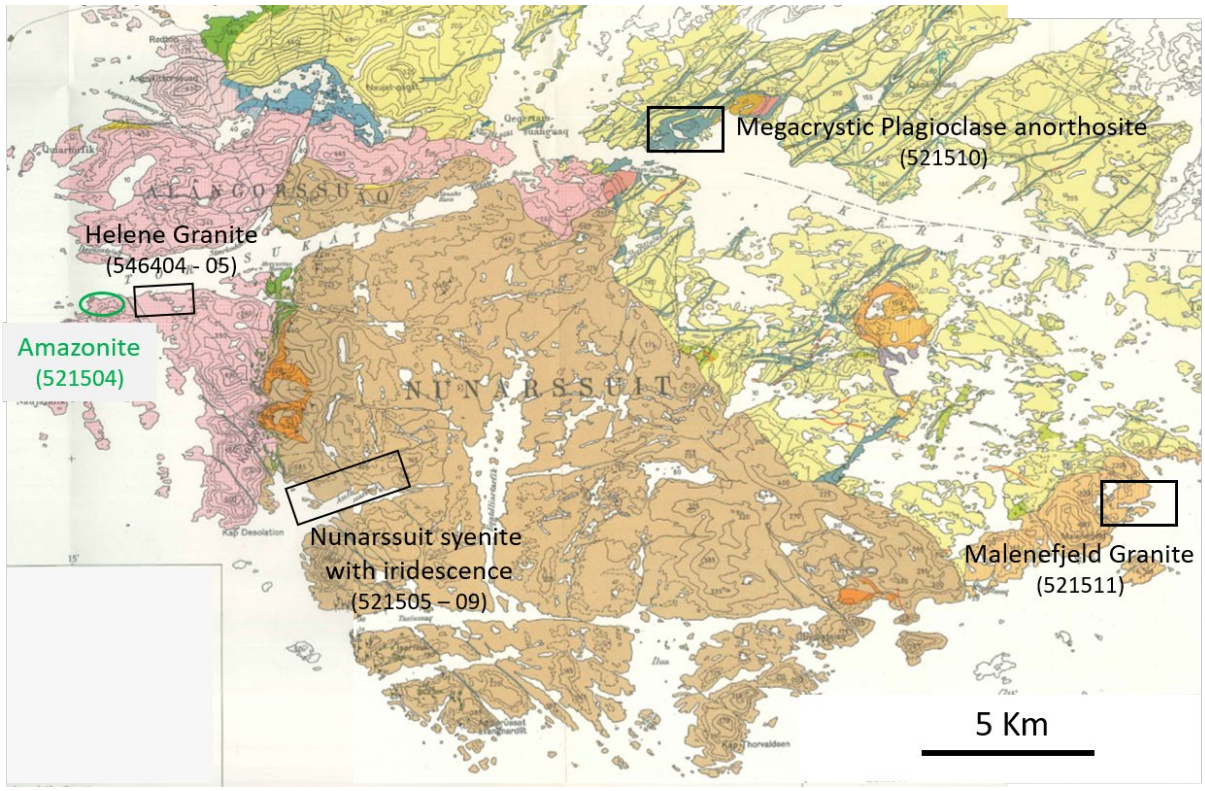

Figure 13 *Geological map of the Nunarssuit Peninsula with the main sampling sites and numbers.*

Figure 14

Helene Granite with cm large semi rectangular K-feldspar. Locality 11.

The Helene Grainte is coarse/grained with a reddish to yellowish weathering pattern (Figure 15a) and outcrops are often covered by yellow rubble. The K-feldspar often show color zoning from pink to grey or white. At places green colour is dominant caused by the content of green

hornblende and pale green clino-pyroxene. The granite is very massive, and joint and faults occur only rarely. Three sites, about 200 m appart were drilled and sampled (546404, 546405, 546406).

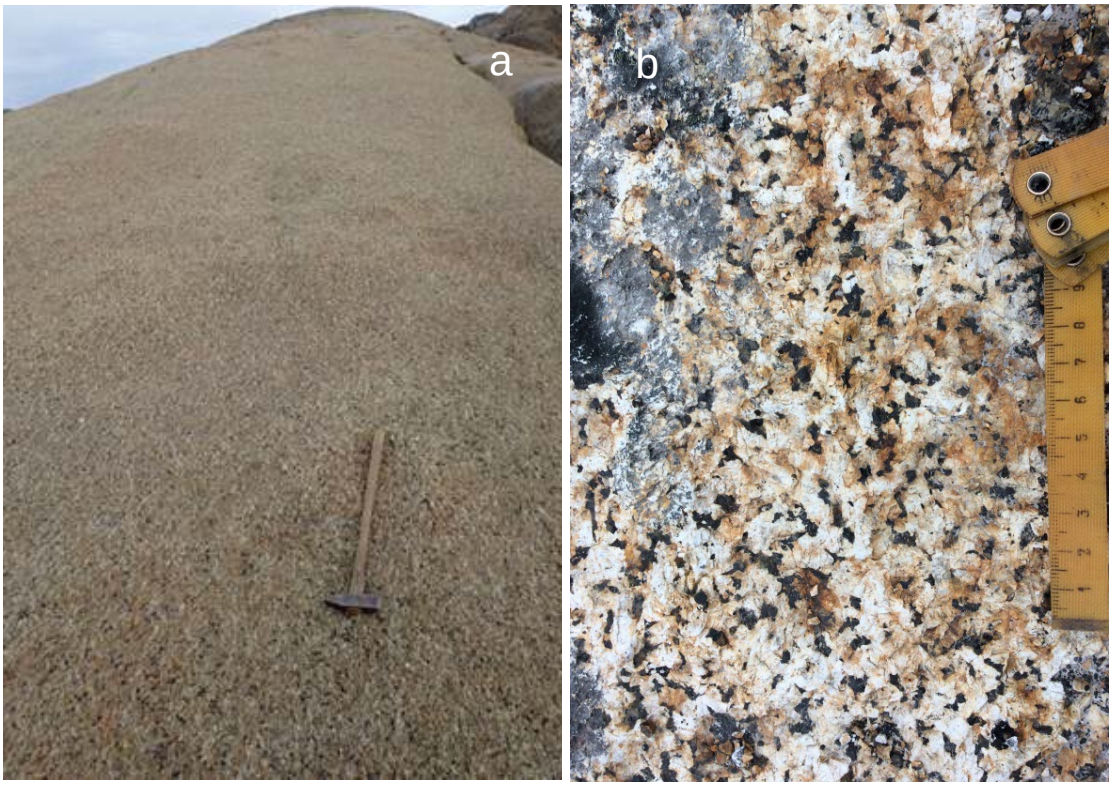

Figure 15 *Helene Granite very few fractures. Locality 11, Sample 546404.*

Figure 16 *Drill sampling from the Helene Granite (sample no. 546404)*

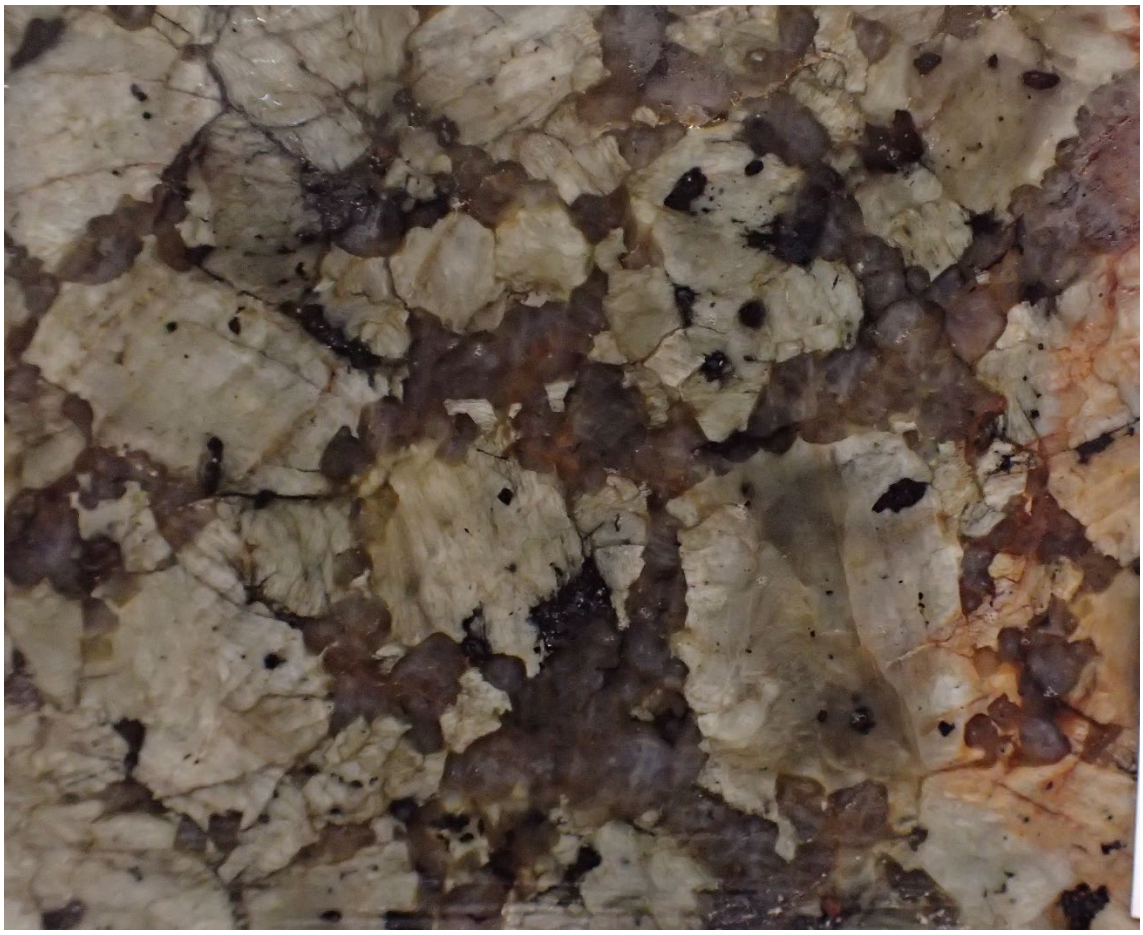

Figure 17 *Polished sample of the Helene Granite (scale 5 cm horizontal, sample 546404).*

Figure 18 *View over the Helene Granite towards West.*

3.4 Granite - Malenefjeld Granite Intrusion, Gardar

The Malenefjeld Granite is also part of the Nunarssuit Complex and is situated in the South-eastern part of Nunarssuit (Figure 13) where it crops out in a ca. 7 by 4 km area. The rock is medium- to coarse-grained even-grained light gray alkali granite. There are areas with low fracture density which were sampled (Figure 19 & 20). The K-feldspar is mainly microcline with pertitic exsolution of sodic feldspar (Harry & Pulvertaft 1963).

Figure 19 *Malenefjeld Granite has very few fractures. Locality 35. Sample 521511.*

Figure 20 *Malenefjeld Granite. Locality 35. Sample 521511.*

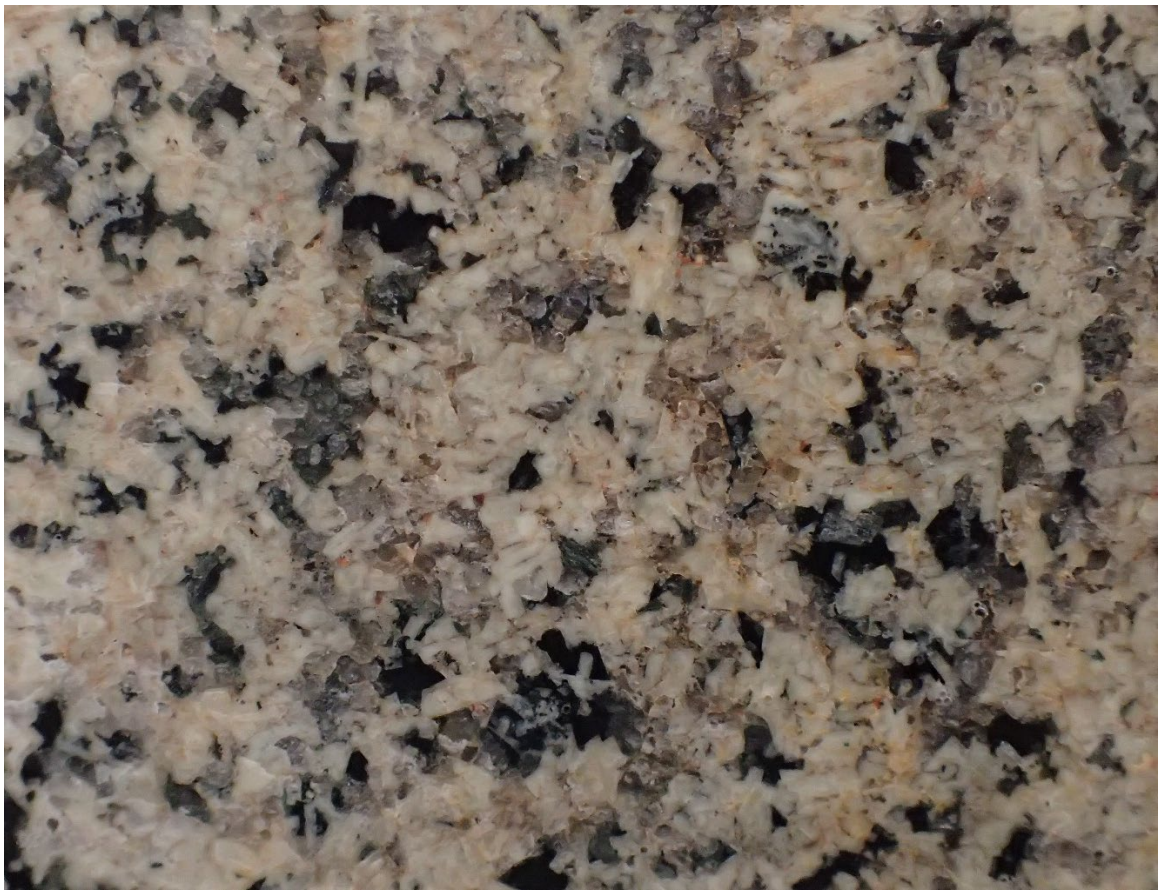

Figure 21 *Malenefjeld Granite. Polished sample 521511. Scale: the horizontal side is 5 cm*

3.5 Syenite - Nunarssuit Syenite Intrusion, Gardar

The Nunarssuit Syenite unit is massive, covering an area of 24 x13 km^2. The Nunarussuit Syenite, is a coarse-grained, dark greenish/bluish rock, in which iridescent feldspar are common. , and thus shows frequently iridescent, resembling the rock-types quarried in Southern Norway. Petrographically, the syenite varies from nordmarkite to larvikite with regular differentiation sequences. The target here is to locate similar syenites with iridescence.

Figure 22 *Contact between Helene Granite (light) and the syenite (dark) on the northern side of Amitsuarssuaq at Cape Desolation).*

Figure 22 *Syenite at Nunarssuit West of Helene Havn. Loc 11.*

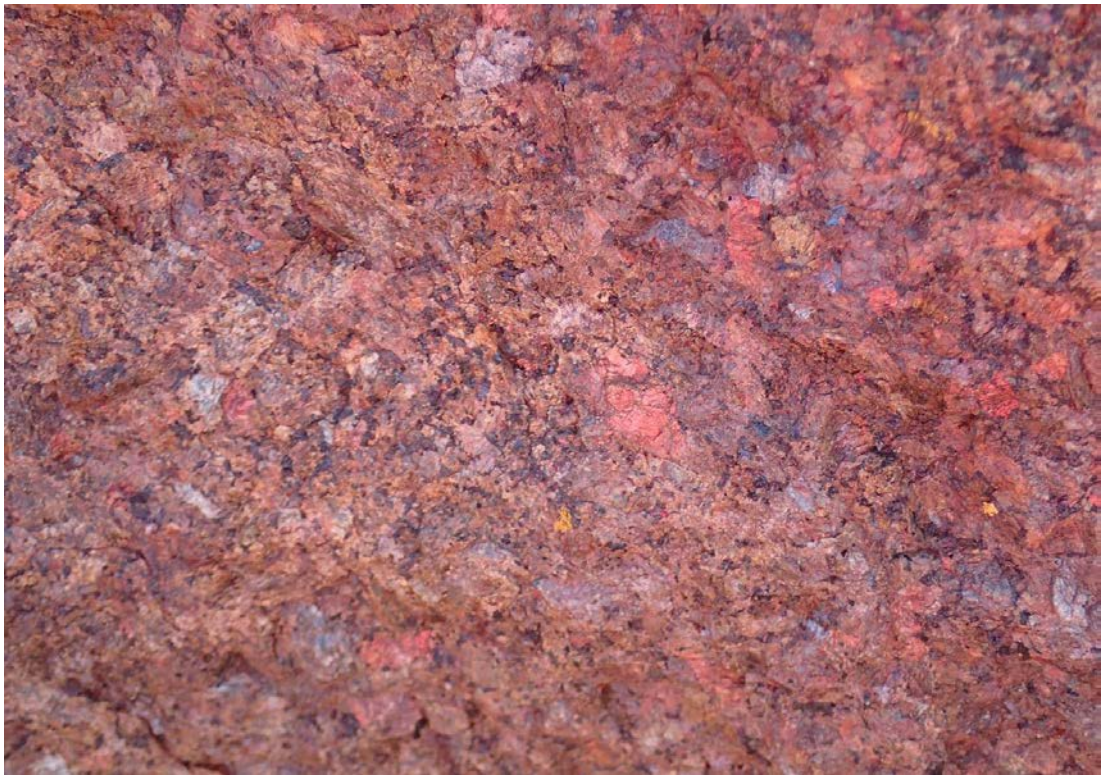

Figure 23 *Syenite with reflection in the feldspar (of red jacket). Northern side of Amitsuarssuaq (loc 13). Scale picture is 5 cm horizontal.*

Figure 24 *Igneous layering in the syenite northern side of Amitsuarssuaq (loc. 14).*

Figure 25 *Igneous layering in the syenite northern side of Amitsuarssuaq (loc. 15).*

Along a stretch of ca 2 km on the Northern side of Amitsuarssuaq it was found that almost all outcropping syenites contain iridising feldspar with a white or silvery shine (Figures 26, 27 & 28) and samples 521505 – 09. The pattern of fractures may be favourable in certain zones.

The rock is characterised by very low fracture density.

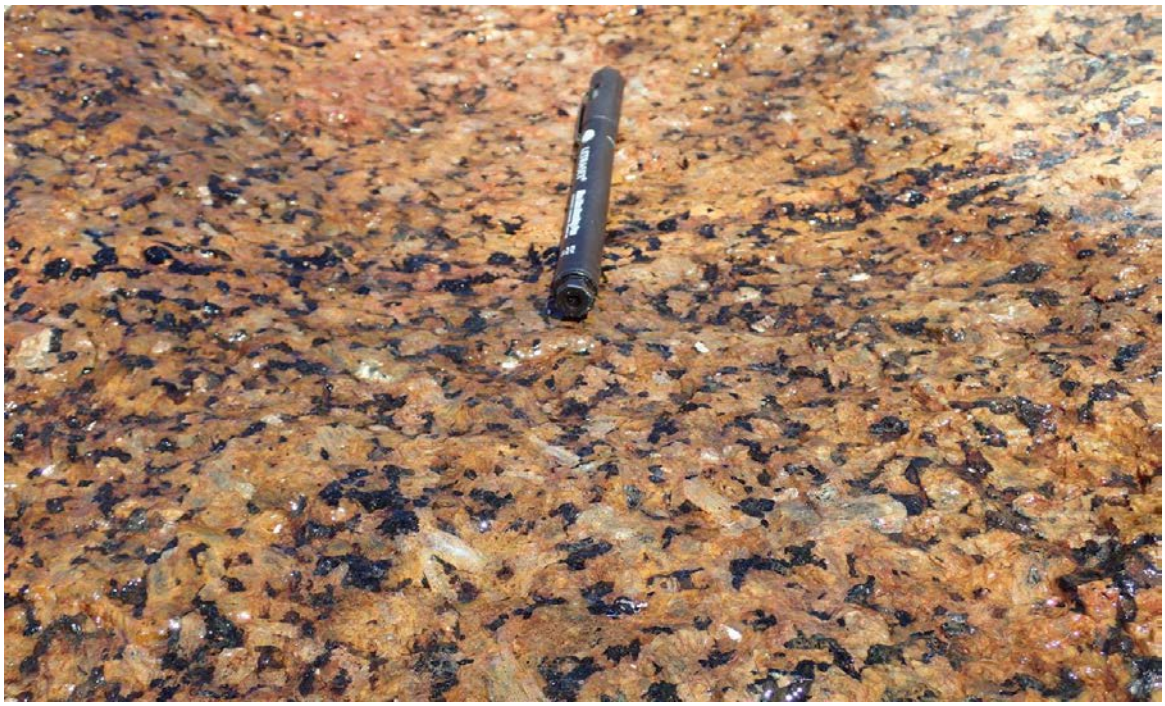

Figure 26 *Syenite with iridescence in the feldspar. Northern side of Amitsuarssuaq (Loc 14).*

Figure 27 *Syenite with iridescence in the feldspar. Northern side of Amitsuarssuaq (Loc 15).*

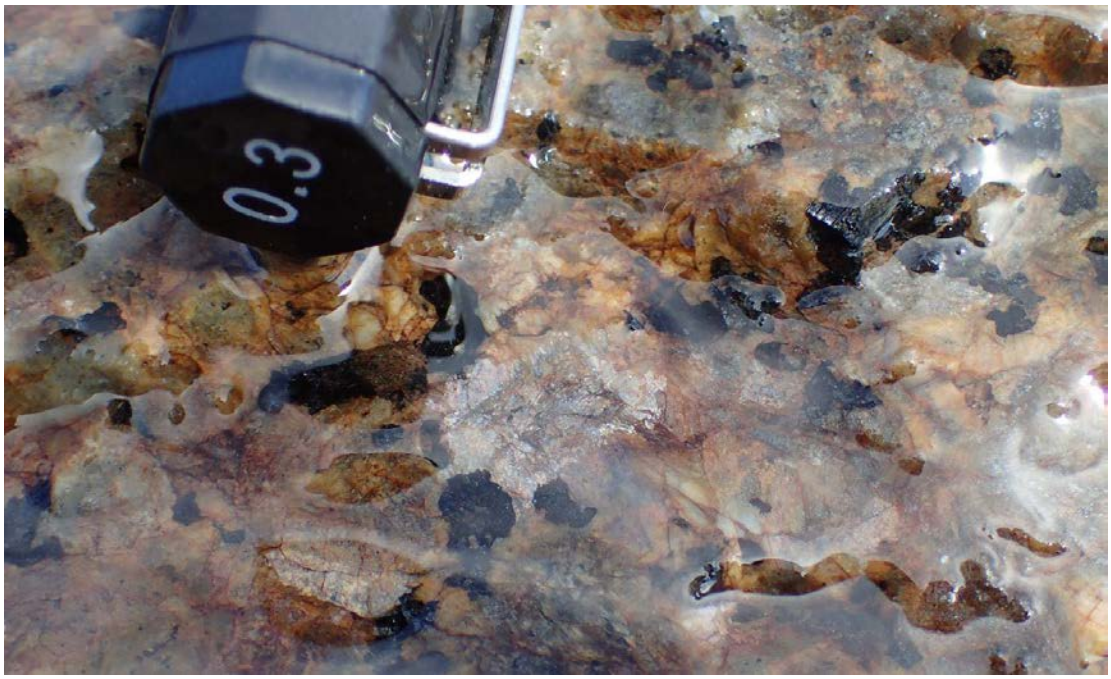

Figure 28 *Syenite with zoning in the iridscent feldspar. Northern side of Amitsuarssuaq (Loc 15).*

Figure 29 *Fracture pattern in syenite with iridescent feldspar.. Northern side of Amitsuarssuaq (Loc 16).*

Figure 30 *Fracture pattern in syenite with iridescent feldspar.. Northern side of Amitsuarssuaq (Loc 17).*

Figure 31 *Syenite with iridescence in the feldspar. Northern side of Amitsuarssuaq (Loc 18).*

Figure 32 *Syenite with iridescence in the feldspar. Northern side of Amitsuarssuaq (Loc 18).*

Figure 33 *Syenite with iridescence in the feldspar. Northern side of Amitsuarssuaq (Loc 14).*

Figure 34 *Syenite with iridescence in the feldspar. Northern side of Amitsuarssuaq (loc 23).*

Figure 35 *Syenite with iridescence in the feldspar. Northern side of Amitsuarssuaq (Loc 24).*

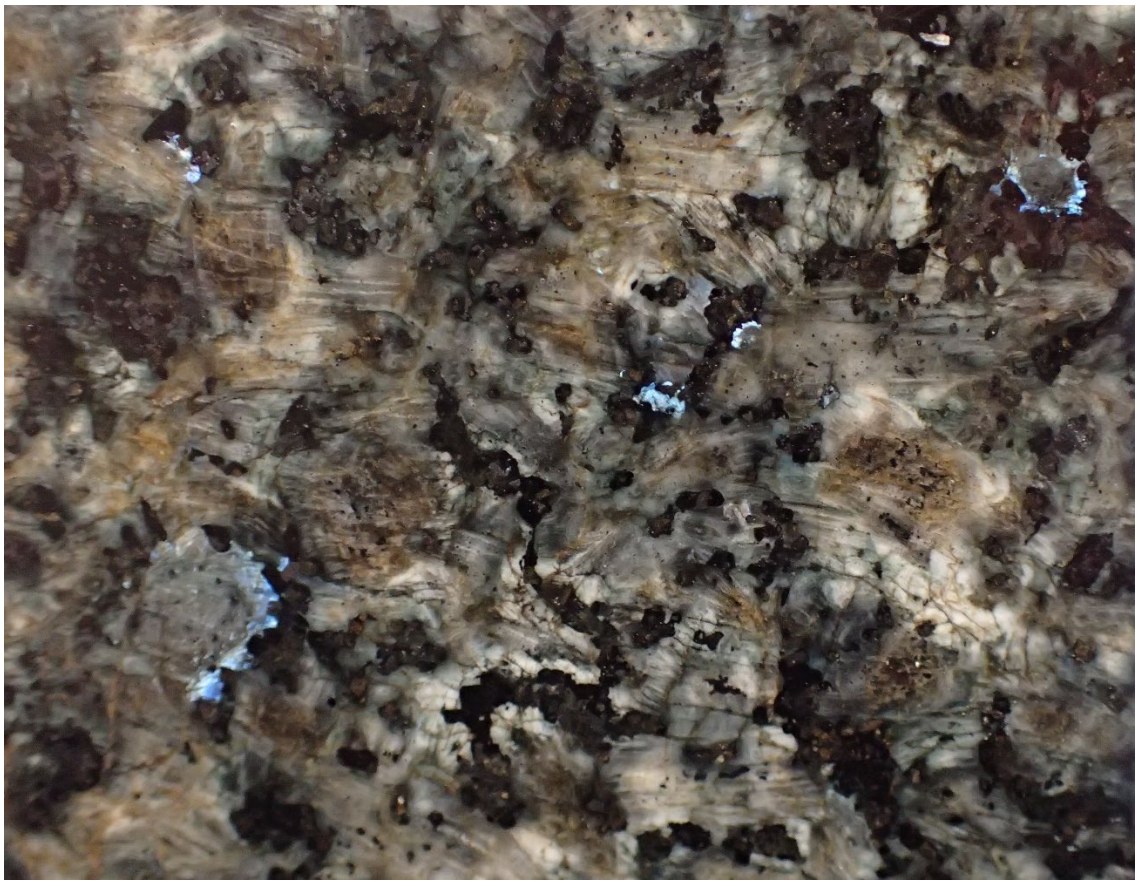

Figure 36 *Syenite with iridescence in the feldspar. (Loc 24, polished sample 521507, horizontal side of sample is 5 cm).*

The northern part of the Nunarsuit Syenite is sampled (no. 546406) from the South shore of Torssukatak, near the contact to the Helene Granite. The syneite is coarse-grained and only very few fractures are observed (Figure 37),

Figure 37 *Syenite Southern side of Torssukatak, sampling 546406.*

3.6 Anortosites in the Bangs Havn Complex

During the geological mapping in South Greenland in the late 50'ties and early 60'ties anorthosites was found in as part of the plutonic suite (Bridgewater 1967). The plagioclase compositions are generally in the range An_{45-60}. which is close to that of the Nain Plutonic suite, and the anorthosite tied to the Giant dykes.

The Bangs Havn complex (Harry & Pulvertaft, 1963, Bridgwater & Harry, 1968) forms part of the Gardar igneous activity extending from Nunarssuit to the Inland Ice. A marginal zone is rich in anorthosite xenoliths (Figure 36) that contain conspicious large plagioclase crystals (Figure 37 & 38). The big-plagioclase anorthosite occurs in pockets, sometimes in considerable thickness.

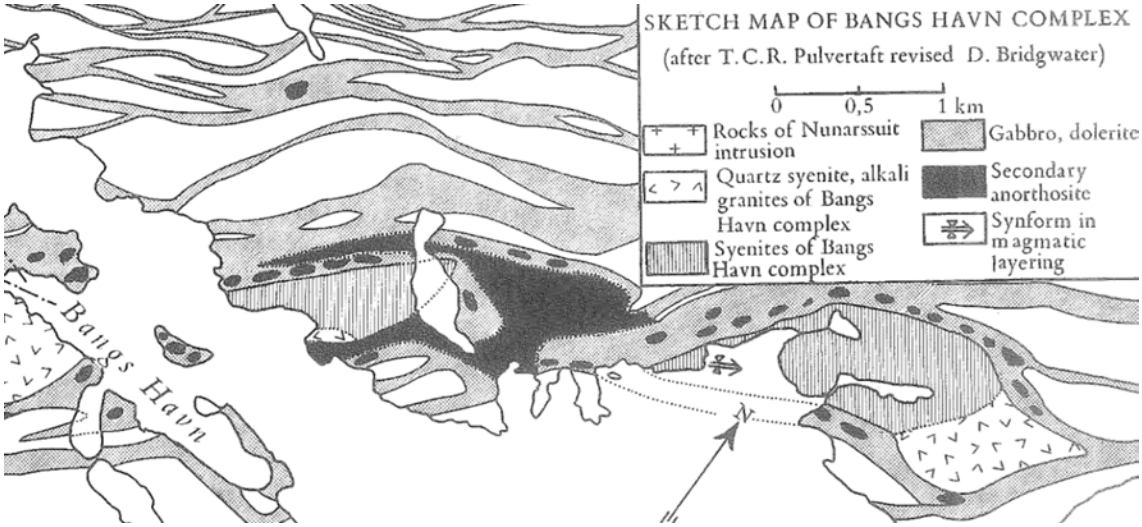

Figure 38 *Geological map of the Bangs Havn Complex. From Bridgwater & Harry (1968).*

Figure 39 *Big plagioclase anorthosite (Loc 26).*

Figure 40 *Big plagioclase anorthosite Loc 32*

3.7 The Hvidal Composite Dyke

The dyke (Figure 41) occurs on Tugtutoq Island, and is approximately 20 km long and 500 m wide trending ENE-WSW and comprises marginal rocks of alkali olivine gabbro, grading inwards to syenogabbro and syenite. The dyke is intruded into rapakivi granite (Figure 42). Both the rapakivi granite and the marginal syeno gabbro, the syenite and a porphyritic dyke (Figure 43 - 46) was sampled.

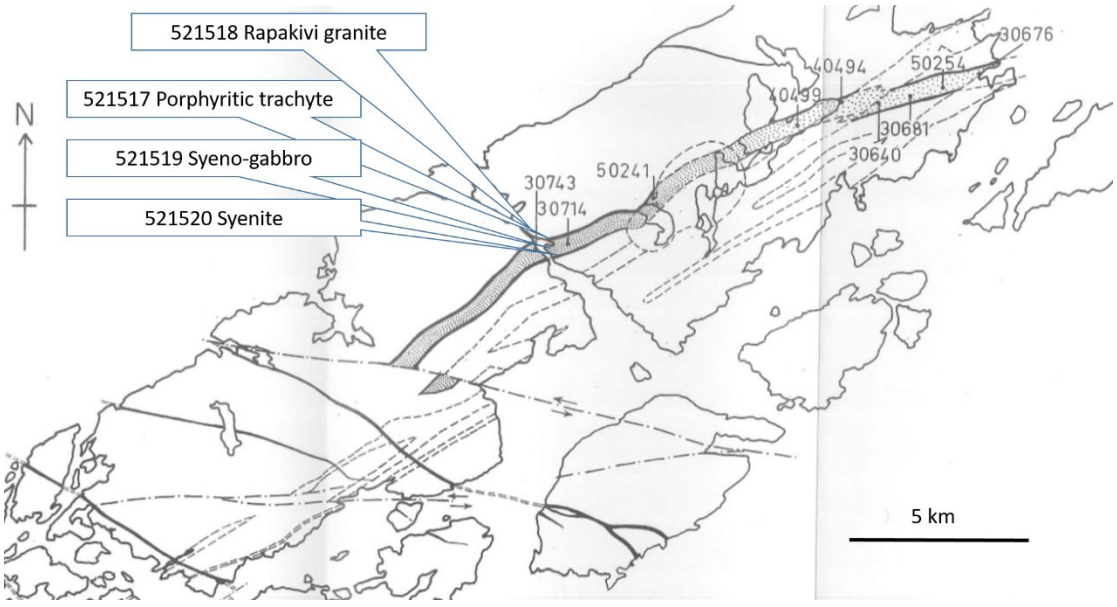

Figure 41 *Geological map og the Hviddal composite Dyke on Tugtutôq Island. From Upton (1964 b). 2018 field season sample numbers are in 6 digits.*

Figure 42 *Rapakivi granite (sample no. 521518)*

Figure 43 *Porphyritic trachyte dyke (Sample no.521517)*

Figure 44 *Syenite in the center of the Hviddal Composite Dyke (sample no. 521520) Locality 49. Very few fractures, but substantial weathering.*

Figure 45 *Syenite in the center of the Hviddal Composite Dyke; Locality 49 (Sample no. 521520).*

Figure 46 *Syenite in the center of the Hviddal Composite Dyke. Locality 50.*

Figure 47 *Nepheline Syenite with igneous layering Hviddal Composite Dyke. Locality 53 sample 521523. Hammer for scale.*

Figure 48 *Syenite Hviddal Composite Dyke NE end of Tugtutoq Island. Locality 54 sample 521524. Contain some iridescence.*

3.8 Narsaq Syenite Intrusion, Gardar

The syenites belonging to Narsaq Syenite is coarse grained with cumulitic texture. Density of fractures in general low.

Figure 49 *The Narsaq Syenite, West of Dyrnæs*

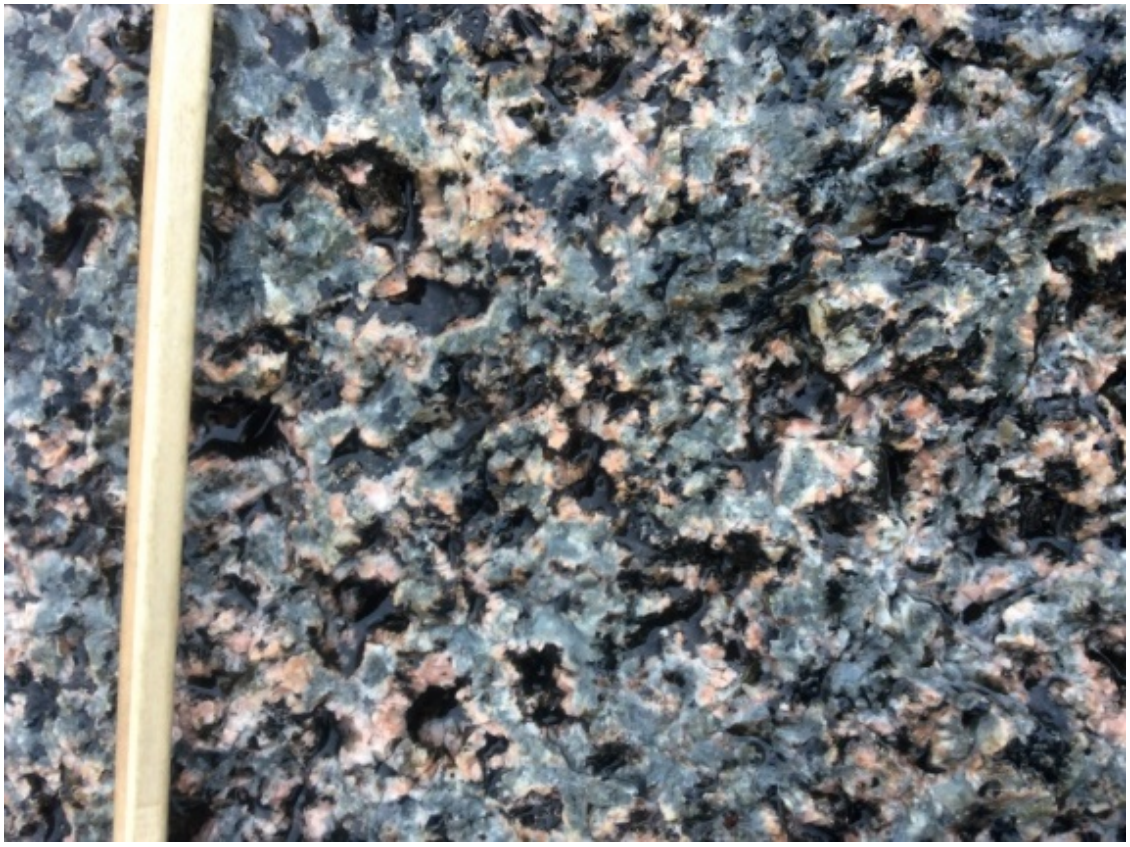

Figure 50 *The Narsaq Syenite, West of Dyrnæs. Hammer as scale.*

Figure 51 *Syenite with igneous layering and trough banding. North of Narsaq. Locality* 59

3.9 Blå Månesø Syenite Intrusion, Gardar

A stock of quartz-bearing perthosite (soda-syenite consisting to a very large extent of perthitic feldspars), located in the central part of Tugtutoq was sampled (sample no. 521526; 521527) (Figure 55, 56, 57).

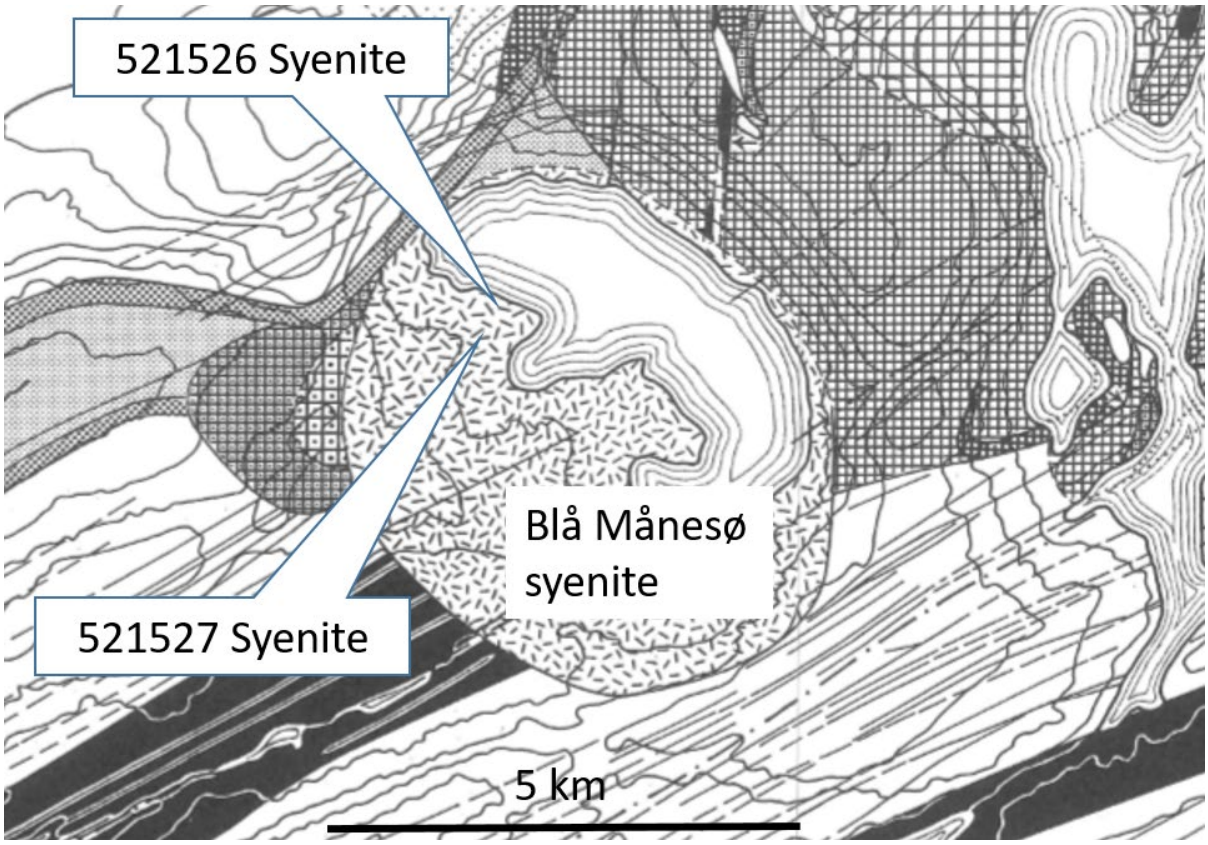

Figure 52 *Geological map of the central part of Tugtutoq (from Upton 1964 b).*

Figure 53 *Blå Månesø – looking East.*

Figure 54 *Blå Månesø syenite (Sample no. 521526). Locality* 59

Figure 55 *Very coarse-grained* Blå-Månesø *syenite. (Sample no. 521527). Locality* 64

Figure 56 *Syenite sample 521528. Locality* 65

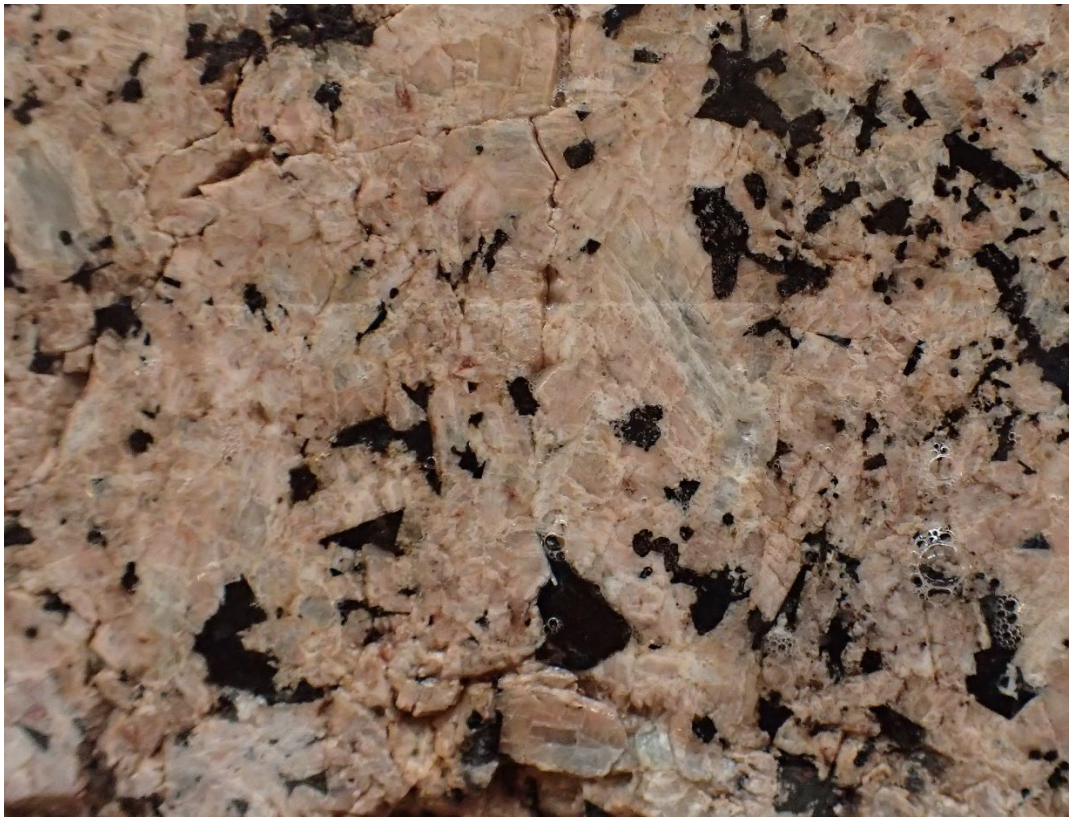

Figure 57 *Polished syenite sample 521528 (Scale horizontal side 5 cm).*

3.10 Quartzite – Eriksfjord Formation

Various samples of sandstones/quartzite's of the Eriksfjord Formation were collected by Rasmussen and Olsen (1993) aiming at getting a representative collection of colors and textures. The greenish variant collected during that campaign appears to attract interest in the market. Thus known localities was visited, with the aim to get a better understanding of volume of the deposits, homogeneities, evaluate potential block size and quality, as well as data related to the logistic challenges.

Figure 58 *Reddish-brown quartzite belonging to the Eriksfjord Formation. The quartzite is bleached and light green along fractures and veins. Densely fractured.*

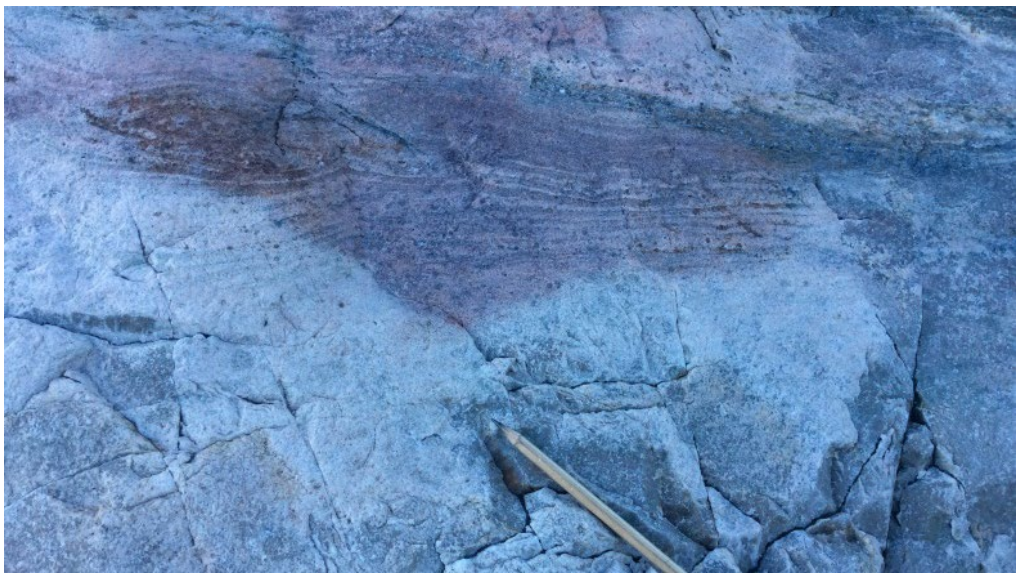

Figure 59 *The red colored, layered sandstone is altered to light green probably tied to chemical reduction of iron.*

Figure 60 *Green quartzite with a pattern of green aegirine-rich veins close to a syenite intrusion. Loc. 60. This is probably the result of progressive alteration of the sandstone due to the close contact to the intrusion.*

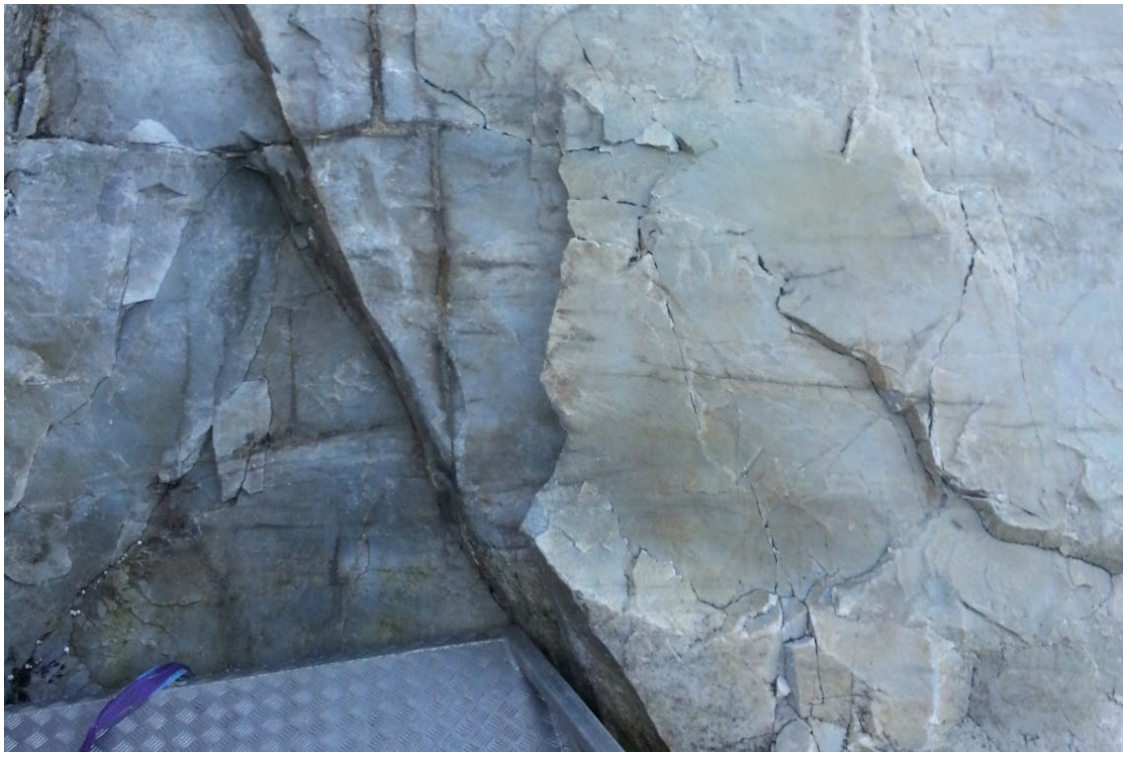

Figure 61 *Well cemented quartzite. Five meter from contact to alkali granite intrusion. Sample 521512*

Figure 62 *Light green quartzite. Sample 521513*

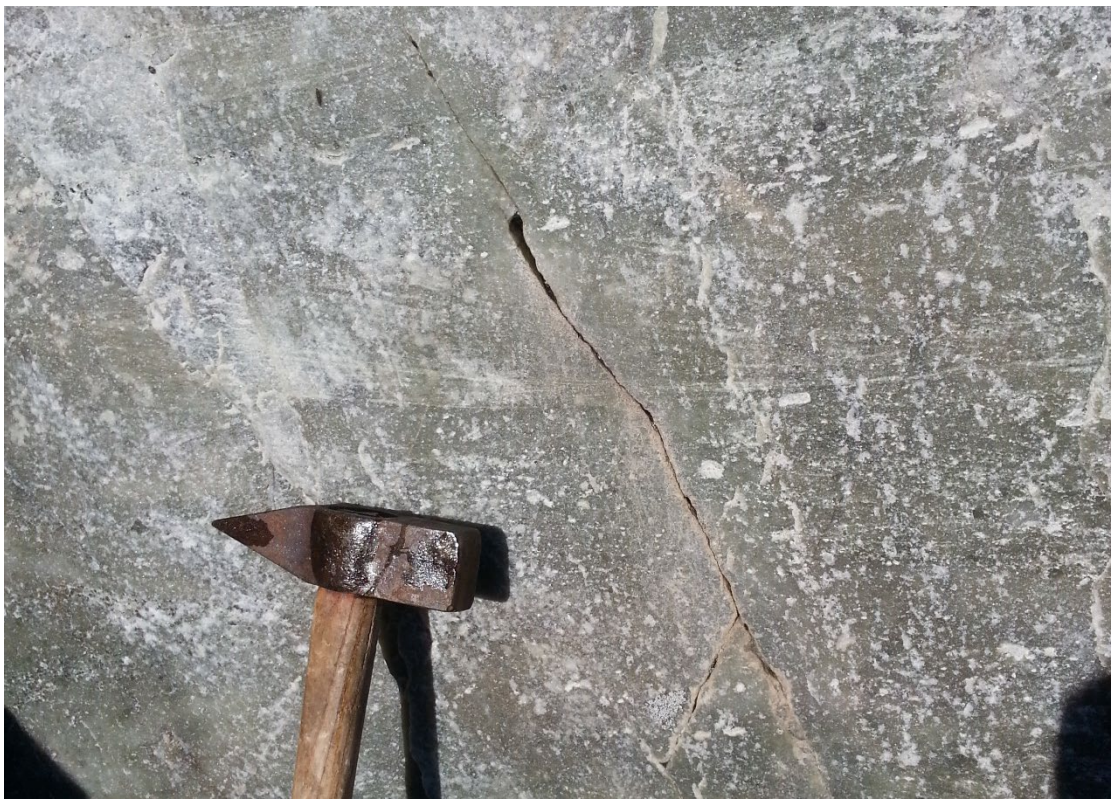

Figure 63 *Light green very well cemented quartzite. Sample 521514*

Figure 64 *Light green very coarse-grained quartzite. Sample 521515*

Figure 65 *Light green quartzite with crossbedding.*

During this field visit, the quartzite was visited in the area South of Narsaq, and on the Southern shore of Tunugdliarfik.

Despite of the high degree of fracturing, the quartzite may be interesting for specialized products, because of the variegated color and structure.

3.11 Kaqortokite and naujaite - Ilímaussaq Intrusion

The kaqortokite and naujaite, both peralkaline syenites, constitutes respectively top- and bottom cumulates of the Ilímaussaq Intrusion. The extreme coarse-grained naujaite was sampled. Fractures will not allow quarrying of big blocks, although the special mineralogy (UV-flourescent sodalite) and texture may carry the potential to source special products. The area is presently licensed; but target area for REE-mining approx. 4 kilometers to the West.

Figure 66 *Sampling the najuaite (syenite). The red mineral is eudialyte.*

3.12 Granodiorite – Julianehåb Granite

A weakly foliated granodiorite has been quarried and used mainly as walkway pavements and boarder, and foundation for structures in the Qaqortoq township. The production was operated by the Municipality on a temporary scale, but appears to have been abandoned. A local entrepreneur is considering to start small scale operation in the area between the municipal waste dump and the town, aimed for production of small, rough building blocks, replacing concrete, in the domestic market.

The granodiorite is not suitable for large standard blocks (Figure 67), due to fractures and minor aplite dykes, but may be suitable for ground tiles and construction blocks.

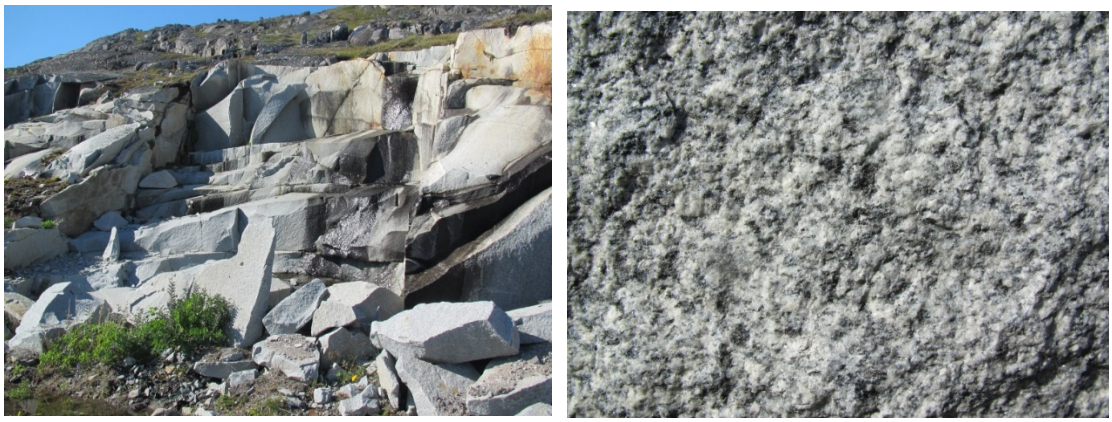

Figure 67 *Granodiorite, part of the Julianehåb Granite*

3.13 Amazonite

Amazonite is a green to blue-green variety of K-feldspar (microcline) known to occur in pegmatite. The green color may be caused by a high content of elements like fluorine or lead.

Larsen conducted fieldwork in the Nunarssuit and Kangeq areas in the period 1985 to 1987 (Larsen 1985, 1987, 1988) with the aim to extract minerals for testing of the market and define the reserves. The amazonite occur in the Helene Granite which is tied to the Gardar igneous province. The conclusion of Larsens work was that the amazonite was tied to late horizontal to shallow dipping pegmatite in the Helene Granite in Nunarssuit and Alangorssuaq areas (Figure 68). Larsen extracted 275 kg amazonite that was given to Qaqortoq Kommune. Further, reserves of ca. 125 kg amazonite was proven and 600 kg estimated. The amazonite occur as green and light green crystals up to 5 cm in size but with small fractures with 1 to 5 mm spacing. The volume is very low seen as an industrial deposit of amazonite, and even for gemstone production.

Figure 68 *Amazonite bearing pegmatite in Helene Granite on NW corner of Nunarssuit.Locality 10.*

Figure 69 *Amazonite bearing pegmatite in Helene Granite on NW corner of Nunarssuit. Locality 10.*

4 Summary

In the period 21st August to 31st August 2018 fieldwork in the Gardar Alkaline Province. The work was based on the ship Johnstrup aiming at locating rocks that can be quarried and marketed as dimension stone for export. The main focus was on the Nunarssuit Peninsula and syenites with iridescence.

Syenitic pegmatite with iridizing feldspar (moonstone) was found as fairly narrow veins in the Kuunnaat Intrusion East of Arsuk. The size of the pegmatite veins is likely to be too small to be interesting from an economic point of view. However, this may be a semi-precious stone resource for local handicrafts.

A deformed and metamorphosed conglomerate belonging to the Late Archean Supracrustals was sampled. The fracture density is high and this not a likely to become a dimension stone.

The amazonite occurrences' on Nunarssuit was visited and sampled. The occurrence may have the potential to support local handicraft as a semi-precious stone. However, the resource is very limited.

Two alkaline granites on Nunarssuit – The Helene Granite and the Malenefjeld Granite was visited and sampled. The fracture density is generally low and the position at the coast is attractive. However, color and texture is not evaluated to be very attractive.

The northern coast of Amitsuarssuaq Fjord on the Western part of Nunarssuit Peninsula has larvikite characterized by feldspar that is partly unmixed on the micro-scale to form a perthite, with alternating alkali feldspar and plagioclase layers that gives its characteristic silver blue sheen (schiller effect/labradorescence/iridescence). The outcrops are also characterized by very few fractures and these rocks form the ideal potential dimension stone.

It is recommended that the quality of the larvikite present on Nunars-suit is investigated further before introducing potential investors to the area.

The focus of these investigations should be on:
1. Acquiring drillcore to a depth of ca. 50 cm.
2. Prospect for localities with optimal iridescence in the feldspar.
3. Measure the density and orientation of fractures.

The Narsaq quartzite contain a fairly high density of fractures and it will not be possible to produce traditional dimension stone blocks. However, smaller blocks can be quarried for production of smaller items.

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Appendix 1 Sample list

No	SampleType	Notes		Date
521501	Rock sample	Light green to greyish syenite	Ckn	22-08-2018
521502	Rock sample	Light green epidote rich sediment.	Ckn	23-08-2018
521503	Rock sample	Metamorphosed conglomerate	Ckn	23-08-2018
521504	Mineral	Amazonite in subhorizontal ca 1 m pegmatite.	Ckn	23-08-2018
521505	Rock sample	Syenite with iridescence	Ckn	25-08-2018
521506	Rock sample	Syenite with iridescence	Ckn	25-08-2018
521507	Rock sample	Syenite with iridescence	Ckn	25-08-2018
521508	Drill core	Syenite with iridescence	Ckn	25-08-2018
521509	Drill core	Syenite with iridescence	Ckn	25-08-2018
521510	Rock sample	Megacrystic plagioclase anorthosite	Ckn	26-08-2018
521511	Drill core	Sodium granite medium to coarse grained	Ckn	26-08-2018
521512	Rock sample	Well cemented quartzite. 5 m from contact.	Ckn	27-08-2018
521513	Rock sample	Quartzite	Ckn	27-08-2018
521514	Rock sample	Green well cemented quartzite	Ckn	27-08-2018
521515	Rock sample	Coarse grained quartzite light green	Ckn	27-08-2018
521516	Rock sample	Cross bedded and laminated sandstone	Ckn	27-08-2018
521517	Rock sample	Feldspar porphyric trachyte	Ckn	28-08-2018
521518	Rock sample	Rapakivi granite	Ckn	28-08-2018
521519	Rock sample	Syeno gabbro	Ckn	28-08-2018
521520	Drill core	Nefeline syenite	Ckn	28-08-2018
521521	Rock sample	Gabbro	Ckn	28-08-2018
521522	Rock sample	Nefeline syenite	Ckn	28-08-2018
521523	Rock sample	Nefeline syenite	Ckn	28-08-2018
521524	Rock sample	Syenite	Ckn	28-08-2018
521525	Rock sample	Hydrothermally altered big feldspar granite	Ckn	29-08-2018
521526	Drill core	Med to coarse grained syenite	Ckn	30-08-2018
521527	Rock sample	Coarse grained syenite	Ckn	30-08-2018
521528	Drill core	Coarse grained syenite	Ckn	30-08-2018
521529	Rock sample	Blaa maanesoe nepheline syenite	Ckn	30-08-2018
521530	Drill core	Naujaite	Ckn	31-08-2018
546401	Rock sample	Syenite greenish coarse grained	Pka	22-08-2018
546402	Rock sample	Syenite	Pka	22-08-2018
546403	Rock sample	Syenite	Pka	25-08-2018
546404	Rock sample	Syenite	Pka	25-08-2018
546405	Drill core	3 core samples	Pka	25-08-2018
546406	Drill core	Syenite core samples 2 pieces.	Pka	25-08-2018
546407	Rock sample	3 drill core samples	Pka	26-08-2018
546408	Rock sample	2 drill core samples	Pka	26-08-2018
546409	Drill core	Syenite. Reddish weathering and wit a red 1 to	Pka	27-08-2018
546410	Rock sample	Julianehåb Granite	Pka	29-08-2018
546411	Rock sample	Julianehåb Granite	Pka	03-09-2018