Technical Report on Mineral Exploration 2014,

Jameson Land and Liverpool Land,

Central East Greenland

Work carried out under exploration licence 2012/01

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Jameson Land Resources A/S

Avannaa Exploration Limited

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Avannaa Resources

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Cover: Aerial view from the SW of Avannaa's base camp in mid-July.

1. Information required by the Bureau of Minerals and Petroleum (BMP)

Bureau of Minerals and Petroleum
Government of Greenland
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According to the rules of the BMP the licensee must forward a geological report each year. This cover with information to the BMP follows the geological report. The cover, abstract and the report shall be forwarded to the BMP in two hard copies and one electronic version no later than April 1st the following calendar year. Unprocessed data shall be submitted to the BMP as both paper and electronic copies. The format of the electronic data shall be agreed with the BMP.
The geological report is the status/field report covering objectives, activities, results, conclusions and recommendations for the licenced area. As stated in ''Rules for field work and reporting regarding mineral resources (excluding hydrocarbons) in Greenland '' sec. 7.03 a geological report must contain the following:

a. The length of the field season and numbers of participants
b. Working methods (sampling methods, analytical techniques with detection limits and name of laboratory, geophysical methods, statistical procedures, drilling methods, etc.)
c. Positioning and marking in the terrain of fix points for local reference systems
d. Topographic maps of the investigated areas
e. Geological maps
f. Sample maps
g. Geophysical maps
h. Sample list
i. Drill log
j. All raw data (chemical values, geophysical values, etc.)

Fulfilment of these requirement are summarised below.

a. The length of the field season and numbers of participants
   Fieldwork start: 18/6-2014
   Fieldwork end: 19/8-2014
   Total number of field days: 63 days
   Number of participants: 14 geologists, 5 drillers, 4 helicopter pilots, 2 cooks, 2 camp managers, 1 paramedic and 1 helicopter mechanic

b. Working methods (sampling methods, analytical techniques with detection limits and name of laboratory, geophysical methods, statistical procedures, drilling methods)
   Procedures and methodology are in the body of the report

c. Positioning and marking in the terrain of fix points for local reference systems
   No fixed points established. Latitude and longitude (WGS84) was used for positioning.

d. Topographic maps of the investigated areas
   None

e. Geological maps
   None

f. Sample maps
See Appendix 1

g. Geophysical maps
None

h. Sample list
See Appendix 1

i. Drill logs
See Appendix 2

j. All raw data (chemical values, geophysical values, etc.)
Attached data CD

2. Licence data

Licence no.:	2012/01
Area:	Jameson Land and Liverpool Land
Year:	3rd
Field period:	June 18th – Aug 19th
Operator:	Avannaa Logistics Ltd.

3. Summary

Avannaa Exploration accomplished field work within the company's licences in Jameson Land, Liverpool Land and Scoresby Land, central East Greenland, during eight weeks in June– August 2014 (Map 1). Daily work was helicopter supported and carried out by up to 14 geologists and assistants from a base camp located in northern Klitdal. The purpose was to further investigate previously found copper mineralisation in Permo-Triassic sediments and in Caledonian crystalline rocks, and to prospect for new mineral occurrences in these units.

The geology of central East Greenland is dominated by the N–S-orientated Caledonian Fold Belt characterised by abundant granitic intrusions and westwards transportation of large thrust sheets. After the orogeny, coast-parallel rift basins - including the Jameson Land Basin - formed during the Upper Palaeozoicum and Mesozoicum. This was ended by Tertiary uplift and magmatism. The geology of the investigated area has been mapped at scale 1:100,000 in 1968–72 by the Geological Survey of Greenland, and previous mineral exploration was mainly carried out 1956–82 by Nordisk Mineselskab A/S (Nordmine). After reconnaissance in 2011, Avannaa accomplished a full field season in the area in 2012. The 2013 exploration was carried out on behalf of Jameson Land Resources A/S, a joint venture between Anglo

American and Avannaa. In addition to the field work described in this report, airborne magnetic and electromagnetic surveys were also flown over parts of Jameson Land in 2013. During the field work, a total of 238 rock samples, 206 stream sediment samples and 31 talus samples were collected. The work was focused on the following geological units:

Caledonian crystalline basement

Avannaa's exploration 2011–13 has demonstrated widespread, structurally-controlled copper mineralisation along N–S-orientated lineaments in granite and migmatite in north-central Klitdal/westernmost Liverpool Land. The mineralisation, which is dominated by chalcocite, chalcopyrite and pyrite with variable amounts of galena and hematite, is typically controlled by NNE–NE trending, reactivated shear zones of a limited extend. Within the shear zones, the sulphides occur both in breccia, vein and joint systems, and disseminated. After the find of three new mineralised localities in 2013, copper mineralisation is known from five outcrops over an N–S distance of *c.* 22 km, and over nearly 40 km if mineralised floats are included. The latter also comprise floats of chalcocite-hematite-bearing brecciated and albitised granite, the source of which has not yet been discovered.

In Avannaa's exploration model, the N–S-orientated lineaments represent a system of listric border faults between the Jameson Land Basin and the Liverpool Land Horst, along which basinal brines moved during dewatering of the basin, thereby forming the structurally-controlled mineralisation in the crystalline rocks. The model implies that the brines also moved into overlaying Permo-Triassic sediments where they formed stratabound mineralisation by precipitating copper, lead and zinc sulphides in suitable traps. Subsequently, the primary sulphide occurrences were probably reworked and redistributed by the widespread Tertiary magmatic activity in the region.

Upper Permian

The Upper Permian sediments on Wegener Halvø comprise a basal conglomerate (Huledal Formation) and lagoonal carbonates (Karstryggen Formation) in the lower part, and carbonate platform to basinal shale deposits in the upper part (Wegener Halvø and Ravnefjeld Formations). The latter is a time equivalent to the European Kupferschiefer and belongs to the same larger depositional basin. It is also a proven oil source rock. Previously reported widespread, scattered occurrence of Cu-Pb-Zn-Ba mineralisation in Wegener Halvø Formation limestones has been confirmed. Furthermore, in 2012 disseminated and massive tennantite, chalcopyrite and bornite associated with brecciation and dolomitisation controlled by NW-trending faults was discovered in a new setting in Karstryggen Formation at the base of the carbonate sequence. In 2013, this was geologically mapped to define structures and thereby possible prospective sites but no new discoveries were made. However, copper mineralisation of limited extend was found below the carbonate sequence in conglomerates, first believed to represent the Huledal Formation but probably belonging to the Devonian sequence. This mineralisation is accompanied by bleaching and silicification of the host rock and seems to be related to N–S trending vertical faults.

Triassic

The Triassic deposits in Jameson Land are dominated by redbed sediments deposited in alluvial fans, in fluctuating rivers, in temporary lakes, and by the wind under desert conditions. On Wegener Halvø, Cu-Pb mineralisation controlled by redox boundaries occurs as interstitial argentiferous chalcocite-covellite and galena in alluvial fan arkoses of the Pingo Dal Formation. In 2012, floats with similar mineralisation were discovered at Tait Bjerg and in northern Klitdal together with widespread, pervasive kaolinisation of the feldspar in arkosic sandstones and conglomerates. In 2013, extensive prospecting along the sediment-basement contact in Klitdal revealed two new styles of copper mineralisation.

At 'Ice Cave Creek' in northern Klitdal, copper mineralisation associated with extensive kaolinisation occurs in arkoses belonging to Klitdal Member of the Pingodal Formation. As the host rock is soft and crumbling, the mineralisation is mainly known from weathering resistant pebbles and cobbles of crystalline rocks. These may be pervasively mineralised with native copper, indicating a very aggressive mineralising brine operating under strongly reducing conditions. Native copper has not previously been observed in the Klitdal Member.

At 'Copper Creek' in central Klitdal, chalcocite, chalcopyrite and hematite occur disseminated and in veinlets in bleached, silicified and albitised Klitdal Member arkoses near a WNW striking lineament. The mineralised rocks appear as float and subcrop on a gentle slope mainly covered by moraine. The nearby occurrence of traditional disseminated chalcocite mineralisation without hematite and albitisation indicates zonation around the lineament which could have acted as feeder for the mineralising brines.

Prospecting in the Triaselv area revealed the first indications of stratabound mineralisation in the Triassic along the western margin of the Jameson Land Basin. The mineralisation, which is known from float and a few poor outcrops, appears to be hosted by a reduced level in Pingodal Formation arkoses. It consists of chalcocite and minor galena occurring disseminated and in veinlets. Copper concentrations encountered are below one per cent.

At a higher level in the Triassic sequence, new outcrops of copper mineralisation were found in Klitdal at the base of Kap Seaforth Member gypsiferous sandstone, confirming the consistent and stratabound character of this previously described mineralisation. It is controlled by mm-thick, organic-rich black shale resting on redbed sandstone, i.e. a redox boundary or a Kupferschiefer setting. Although the shale might be extremely copper, silver or lead rich, its tiny thickness exclude economic significance at the known localities. However, a potential exists for lateral facies shifts into greater thickness and importance of the copper shale.

Geochemistry

In 2012, 699 stream sediment samples were collected in streams draining the Permo-Triassic sediments of Wegener Halvø, Tait Bjerg and Klitdalen area, resulting in a number of base metal anomalies. In 2013, this was supplemented by 206 stream sediment samples focused on the crystalline parts of western Liverpool Land. While no significant new anomalies were located in the basement rocks, the mineralisation in Klitdal and Kap Seaforth Members at 'Copper Creek' is neatly registered as a trail of Cu-Pb-Ag anomalous samples in the creek.

4. Introduction

This technical report covers work undertaken by Avannaa Exploration Ltd. in 2014 within licences 2012/01 in central East Greenland 70°30'–72°N lat. (Map 1). The exploration target was copper hosted within Permo-Triassic sediments and brecciated Caledonian granite.

Mobilisation and demobilisation was from Constable Pynt airport and fieldwork was supported from a base camp and two fly camps by up to 24 geologists and assistants, see Table 1. The base camp was located in northern Klitdal (71°13.8'N, 22°23.4'W). The work was carried out on daily flights with an AS350B3 helicopter chartered with two pilots and a mechanic from Air Greenland A/S who were stationed in the base camp. The weather and snow conditions were conductive to fieldwork, except for the seven days where low clouds, snow and high winds slowed the drill mobilisation.

Information required by the Mineral Licence and Safety Authority is given in section 1 of this report.

Table 1. List of geologists and assistants participating in the 2014 field work.

Name	Job Title:	Company Name	Field Period
Peter Holmes	Project Manager	Avannaa Logistics	29/06/14-13/08/14
Bjørn Andresson	Database Manager	Avannaa Logistics	02/07/14-19/08/14
Bjørn Thomassen	Geologist	Avannaa Logistics	15/07/14-12/08/14
Emma Rehnstrom	Geologist	Avannaa Logistics	22/07/14-12/08/14
Sebastian Stelter	Drill Manager	Anglo American Corp	29/06/14-13/08/14
Peter Dodds	Geologist	Anglo American Corp	29/06/14-13/08/14
Craig Hartshorne	Geologist	Anglo American Corp	29/06/14-13/08/14
Arthur Blain	Exploration Manager	Anglo American Corp	05/08/14-12/08/14
Malik Ljungdahl	Geological Assistant	Avannaa Logistics	02/07/14-28/0714
Tim Roedel	Geologist	Avannaa Logistics	08/07/14-13/08/14
Dennis Bird	Geologist	Avannaa Logistics	22/07/14-13/08/14
Pierpaolo Guarnieri	Research Geologist	GEUS	22/07/14-05/08/14
Anais Brethes	Geologist	GEUS	22/07/14-05/08/14
Ben Wilkins	Geologist	Avannaa Logistics	12/08/14-19/08/14

5. Property Description and Location

Avannaa Exploration Ltd. holds two exclusive mineral exploration licences: 2012/01 consisting of five sub areas in Jameson Land and Scoresby Land, central East Greenland; and 2013/13 covering the western part of Liverpool Land, and Canning Land. The licence no. 2012/01 is valid for the years 2012–16 and covers an area of 894 km^2, while 2013/13 is valid for 2013–17 and covers 1037 Km^2 (Map1). The licence areas are wholly outside of the National Park of North and North-East Greenland. This is supplemented with a non-exclusive prospecting licence covering East Greenland south of 75°N lat. and east of 44°W long.

6. Accessibility, Climate, Local Resources, Infrastructure and Physiography

Jameson Land in central East Greenland between *c.* 70°30'–72°N lat., is part of a large peninsula situated between two major NW-SE-orientated fjord systems: Scoresby Sund and Kong Oscar Fjord. It is bordered by Liverpool Land to the east and Scoresby Land to the west (Map 1). The topography is gentle and characterised by plateaus of moderate altitude without significant glaciers and intersected by broad valleys. Although the climate is arctic and the valleys are underlain by permafrost, they are typically covered by dwarf vegetation supporting wildlife of musk ox, goose etc., and they are snow-free from early June till late September. Fjords are all deep water and are ice-free July–October.

Access to the area is by aircraft to Constable Pynt airfield (scheduled flights from West Greenland and Iceland) in southern Jameson Land, and to Mestersvig airfield in northern Scoresby Land - gravel runways that can accommodate planes to C-130 size. A helicopter transfers passengers from Constable Pynt to Scoresbysund, the only permanent settlement in the region. While Constable Pynt is a civil airport, the Mestersvig airfield is operated by the Danish Military. There are harbor facilities at Scoresbysund, Constable Pynt and Mestersvig (Nyhavn) with yearly services by the Royal Arctic Line. Several STOL (short take-off and landing) runways in the area are commonly used by Twin Otters for both civil and military purposes.

7. History of Investigations

Geological investigations and systematic mapping were carried out in central East Greenland 70°–76° N lat. by the Danish Expeditions to East Greenland ('Lauge Koch Expeditions') 1926–58. In 1968–72, the Geological Survey of Greenland mapped the area 70°–72°N lat. at scale 1:100,000; Avannaa's licence is covered by the 1:100,000 map sheets 70 Ø.1N, 71 Ø.1S, 71 Ø.1N, 71 Ø.2S and 71 Ø.2N. A 1:500,000 scale map over the region was also issued (Bengaard & Henriksen 1984). Subsequently, the 1:500,000 map data were transferred to a revised topographic base map and made available in digital format (Mikkelsen *et al.* 2005). Unfortunately, the colouration is sometime erroneous in the digital version.

An airborne electromagnetic and magnetic survey of the northern part of the Jameson Land Basin was conducted by the Geological Survey of Denmark and Greenland (GEUS) in 1997 (Stemp 1998), and in 2000 the survey organised an airborne hyperspectral survey over selected mineral occurrences in central East Greenland, including Wegener Halvø and Canning Land. This was follow up on the ground in 2005 and 2008–09 (Thomassen & Tukiainen 2008, Tukiainen & Thomassen 2010).

In 2012, an airborne hyperspectral and Lidar survey was flown over eastern Jameson Land/western Liverpool Land by NERC (Natural Environment Research Council, UK). This survey was commissioned by GEUS.

Mineral exploration was carried out in the Jameson Land area 1956–82 by Nordisk Mineselskab A/S (Nordmine)**,** the company holding the mineral rights over central East Greenland 1952–1991. The results of this work have been summarised by Harpøth *et al.* (1986). Subsequently, hydrocarbon exploration was carried out in the Jameson Land Basin by a consortium led by Atlantic Richfield Company (ARCO) 1984–1990. In 1991, Rio Tinto Zinc Mining and Exploration did exploration for nickel in the area (Coppard 1991) and Pasminco Australia Ltd. explored for lead-zinc in 1992 (Wright *et al*. 1992). From 2007 Nordic Mining Co., now China-Nordic Mining Co., has explored for base metals in the Permo-Triassic sediments of the Jameson Land Basin within a licence consisting of four sub areas, including the Devondal area of southernmost Wegener Halvø.

Avannaa did a brief reconnaissance in the Klitdal area, Jameson Land in 2011 (Thomassen 2012) followed by a full field season inside an exclusive exploration licence (2012/01) over parts of northern Jameson Land in 2012 (Thomassen & Rink 2013). In order to continue this work, a new company - Jameson Land Resources A/S. - was formed in the fall 2013 as a part of a joint venture agreement between Anglo American plc and Avannaa Resources with Avannaa as operator. Simultaneous a supplementary new licence east of 2012/01 was acquired (2013/13).

A fixed-wing aeromagnetic survey over eastern Jameson Land and western Liverpool Land was conducted in May–June 2013 by Fugro, and a combined magnetic/time-domain electromagnetic survey was flown mainly over the eastern Jameson Land area by SkyTEM in September–October 2013.

In July–August 2013, fieldwork was carried out in eastern Jameson Land, western Liverpool Land and eastern Scoresby Land. Promising targets identified in 2012 were followed up with detailed prospecting, ground geophysics and geological mapping. Reconnaissance prospecting was continued for new mineralisation in the various units and structural settings. Prospecting produced 238 rock samples and 31 talus samples. Drainage sampling generated some 206 stream sediment samples (Thomassen *et al.* 2014).

8. Geological Setting

The geology of central East Greenland is dominated by the N–S-orientated Caledonian Fold Belt formed by the collision between Laurentia and Baltica 465–400 million years ago. The Caledonian orogeny is characterized by abundant granitic intrusions and westwards transportation of large thrust sheets, of which the uppermost is the so called Hagar Bjerg thrust sheet. After the orogenesis, coast-parallel rift basins formed during the Upper Palaeozoicum and Mesozoicum. This was terminated by Tertiary uplift and magmatism. Sedimentation in the rift basins included an up to 1800 m thick Permo-Triassic sedimentary succession dominated by shallow marine sediments in the Upper Permian and lowermost Triassic, and continental–lacustrine sediments in the main part of the Triassic.

Jameson Land and eastern Scoresby Land form the Jameson Land Basin, an up to 100 km wide and 200 km long, N–S-orientated sedimentary basin bordered by Caledonian crystalline rocks along both the western margin towards Stauning Alper and along the eastern margin towards Liverpool Land. The seismic survey carried out by ARCO indicates that the basin contains Upper Palaeozoic and Mesozoic sediments with a total thickness of over 15 km .

8.1 Caledonian crystalline basement

Both Liverpool Land to the east of the Jameson Land Basin and Stauning Alper to the west are underlain by Precambrian, marble-bearing metamorphic rocks and granites–quartz-monzonites of Caledonian or Neoproterozoic age belonging mainly to the Hagar Bjerg thrust sheet (Higgins *et al.* 2008). Some rocks on southern Liverpool Land are assigned to a lower thrust sheet.

Liverpool Land forms a *c.* 3500 km^2 horst of Caledonian crystalline rocks separated from the Jameson Land Basin to the west by a major N–S-oriented fault zone (Coe & Cheeney 1972). A northern continuation of the horst block occurs on Canning Land and Wegener Halvø where younger rocks are exposed. Another major N–S-oriented fault zone, the so-called 'Post Devonian Main Fault' or 'Stauning Alper Fault' delimits the Jameson Land Basin to the west.

8.2 Neoproterozoic sediments

Slightly deformed and metamorphosed Neoproterozoic sediments belonging to the Eleonore Bay Supergroup (EBS) are exposed on northern Canning Land and in two small areas on Wegener Halvø. The sequence comprises both quartzites and black shales of the lower EBS and shales and limestones of upper EBS (Caby 1972).

8.3 Devonian

An up to 8 km thick pile of Devonian continental clastic sediments were deposited in N–S-orientated basins in central East Greenland during the extensional collapse of the Caledonian orogeny (Larsen *et al.* 2008). This was accompanied by minor felsic and mafic volcanic activity. In the Jameson Land Basin, Devonian rocks are only exposed on Wegener Halvø and Canning Land to the NE and in a small down faulted area on southern Liverpool Land. However the ARCO seismic survey indicates the existence of a thick pile of Devonian rocks in the lower part of the basin.

8.4 Carboniferous–Lower Permian

After initial rifting in earliest Carboniferous, a more than 3 km thick sequence of fluvial sandstone and shales were deposited in narrow N–S-trending half-grabens in central East Greenland. Deposition ceased in the earliest Permian after which a new episode of regional uplift and erosion took place. In the Jameson Land Basin, a broad belt of Permo-Carboniferous sediments are exposed along the western margin of the basin and in two small areas on Wegener Halvø–Canning Land (Kempter 1961, Collinson 1972). Further, the

ARCO seismic data indicates several kilometres of Permo-Carboniferous sediments below the central parts of the basin.

8.5 Upper Permian

The Upper Permian sediments in central East Greenland represent the first marine transgression after the Caledonian orogenesis; they rest on older sediments with a distinct angular unconformity. The up to 300 m thick sequence, the Foldvik Creek Group, comprises five interfingering shoreline-shallow marine liothofacies deposited in coast-parallel rift basins (Surlyk *et al.* 1986). The deposits include a shoreline conglomerate overlain by marginal marine carbonates and evaporites in the lower part, and carbonate platform to basinal shale deposits in the upper part. In the Jameson Land Basin, the Upper Permian sediments are extensively exposed along the western margin; to the east outcrops are restricted to Wegener Halvø and a small area on Canning Land. The five formations are:

Huledal Formation: A basal fluvio-marine sandy conglomerate unit, typical 5–25 m thick in Jameson Land.

Karstryggen Formation: The most widespread of the Upper Permian units. It is composed of hypersaline limestones and gypsum, typically 5–30 m thick but may locally exceed 100 m's thickness. Karstified horizons are widespread in the marginal parts of the basin and the top is in most areas a mature karst surface which in places shows up to 100 m relief. Thus the Huledal and Karstryggen Formations together form a transgressive-regressive sequence.

Wegener Halvø Formation: Comprises a variety of limestones deposited in marine environments formed as the result of a new Late Permian transgression which has been correlated with the onset of the Zechstein sedimentation in NW Europe. The shallow marine limestones formed 10–20 km wide carbonate platforms along the margins of the basin. Here the thickness is locally more than 200 metres, decreasing to less than 5 metres centrally. The eastern margin is dominated by large bryozoan mounds with up to 125 metres of relief to the central shale basin. Along the western margin mound development is less prominent.

Ravnefjeld Formation: Composed of black, bituminous, laminated mudstone alternating with grey, calcareous, bioturbated mud. It accumulated contemporaneously with the Wegener Halvø Formation in the central and eastern part of the basin with a maximal thickness of 60 m in small basins between mounds to the east, where it may interfinger with beds of carbonate debris from the mounds. The black, bituminous mudstone is a proven oil source rock. It is also a time equivalent to the European Kupferschiefer and is interpreted to belong to the same larger depositional basin.

Schuchert Dal Formation: Includes a progradational sequence of coarse clastics and shales which during the latest Permian filled in the basin almost completely. In most areas the top of the Formation is represented by a depositional break at the Permian–Triassic boundary.

8.6 Triassic

In Triassic time the sea retreated and an elongated inland basin formed in which *c.* 1400 m redbed sediments were deposited in alluvial fans, in fluctuating rivers, in temporary lakes, and by the wind under desert conditions (Clemmensen 1980 a, b). Thus the Scoresby Land Group, divided in four formations, comprises conglomerates and sandstones along the basin margins while fine-grained lake sediments and dune sandstones with sporadic thin layers of limestone and gypsum were deposited in its inner parts. The Triassic sediments are exposed over fairly large areas in the western, eastern and northern parts of the Jameson Land Basin. The four formations are:

Wordie Creek Formation: The 70–500 m thick marine unit consists mainly of green silty shales and sandstones, outcropping in the northern parts of the Jameson Land Basin.

Pingo Dal Formation: The 70–500 m thick formation is dominated by continental red or grayish conglomerates, pebly sandstones and arkoses. They represent alluvial fan deposits (Klitdal and Paradigmabjerg Members) along the basin margins grading into floodplan sediments towards the center.

Gipsdalen Formation: A 100–375 m thick sequence of variegated, gypsiferous sandstones and mudstones with a unit of grey limestones and dark mudstones (Gråklint Beds) occurring over large areas in the middle of the Formation. The 2–35 m thick Gråklint Beds represent a brief marine episode in the otherwise continental-lacustrine Gipsdalen Formation.

Fleming Fjord Formation: A 200–400 m thick unit of playa lake origin comprising stromatolitic dolostones, sandstones and mudstones grading into red mudstones, followed by grey sandstones and limestones upwards in the sequence.

Jurassic–Tertiary

Shallow and deep-water sandstones and shales were deposited during the Jurassic and Cretaceous. Black shales of Early Jurassic age are proven oil source rocks. In the Jameson Land Basin, the Palaeogene magmatic activity is represented by mafic dykes and sills, and by felsic and mafic intrusive complexes. The up to 100 m thick mafic sills are mainly intruded at the base of the Jurassic sequence (Kap Stewart Formation) but also occur in the Triassic (Fleming Fjord Formation) especially in the western part of the basin. It has been debated, whether the basin has ever been covered by plateau basalts like areas further to the south and north in the East Greenland Tertiary volcanic province. These basalts could have been eroded after the Neogene uplift.

New research by Pierpaolo Guarnieri, GEUS, (pers. comm. 2014) indicates a compressional regime in the Jameson Land Basin during the Middle-Late Devonian and Early Carboniferous (Haller 1971 and references herein). In Upper Permian and Lower Triassic, the basin formed a westward-tilted half graben (Appendix 7). In Early Miocene some of the former rift-related faults were re-activated with a left-lateral component causing the inversion and exhumation of the Liverpool Land-Wegener Halvø area.

9. Mineralisation

Thomassen et al. (2014) provides a summary of the historical analytical results and mineralised showings for the region.

9.1 Ore Deposit Model (reduced facies)

- Sediment-hosted copper deposit (possible Kupferschiefer analogue)
- Main characteristics:
  - Stratabound or stratiform cuprous unit with thickness of 5m (usually less)
  - Typically associated with rift environments
  - Likely hosted within Klitdal Formation arkoses overlying redbed conglomerates
  - Areally/volumetrically extensive with grade continuity; potentially 5 km x 5 km
  - Deposition of Cu from aqueous, chloride-rich solutions crossing redoxcline between footwall red beds and reduced, sulphide-bearing grey beds of host strata
  - Grade average >2% Cu for economic deposits

- Important features:
  - Configuration of the basement
  - Long-lived and large-scale fluid flow systems
  - Reducing carbonaceous shales in contact with redbeds

9.2 Exploration Model

- Process-driven exploration model requires four conditions (Cox *et al.* 2003):
  - Oxidised source rock that is hematite stable containing ferromagnesian minerals or mafic rock fragments from which copper can be leached
  - Source of brine to mobilise copper; evaporites are commonly interbedded with redbeds
  - Source of reduced fluid to precipitate Cu and form a deposit; organic-rich shales, carbonate rocks, pockets of liquid or gaseous hydrocarbons in host sediments or any sedimentary fluid in equilibrium with pyrite
  - Conditions favourable for fluid mixing; 1/ pre-lithification permeability in shale provides bedding-parallel sites for mixing, 2/ sediment compaction increases fluid pressures with most deposits at basin margins 3/ faulting or folding producing a hydraulic head may cause one fluid to invade the site of another; 4/ permeable host rock for fluid mixing

10. Exploration by Avannaa/Jameson Land Resources 2014

Field crews arrived in Constable Pynt on June 13th to begin the mobilization of camp materials and the drill rig to the Jameson Land Resources licence. A camp building crew completed the construction of a 25-person camp enclosed by an electrified bear fence. The camp was ready for occupation by June 30th maintaining an average of 21 persons during its use. On completion of the field programme, the camp was completely dismantled and removed with all remaining crew departing on August 18th.

The mobilization of the core-drill onto the first site was slowed by weather so the drilling only commenced on July 11th. A total of eight holes were completed with a total of 1,775 metres drilled. Drilling was completed on August 7th and the rig was demobilized to Constable Pynt by August 12th. The drilling focused on two areas in the eastern part of Jameson Land; Ice Cave Creek and Copper Creek. A third area called the 'Triangle' was proposed for drill-testing but removed from the final drill plan.

The locality names used in the report are not official place names: 'Triangle', 'Ice Cave Creek' and 'Copper Creek'.

10.1 Prospecting

The prospecting plan aimed to intensify the coverage around the various drill sites including detailed mapping. Also following the reconnaissance prospecting in the Western Klitdal area in previous years where scattered occurrences of Cu mineralization were reported (Thomassen & Rehnström. 2014), a series of remote two-person camps were planned to expand coverage in this area. A total of eight camps were used by two teams comprised of two geologists each. The camps were moved by AS350B3 helicopter every three to four days after each area was covered by ground traverse.

The marginal areas of the Jameson Land Basin were targeted for the prospecting based on the ore deposition model. The pressure from the overlying sedimentary package would cause the mineralised fluids to migrate upwards along the impermeable basement contact.

Isolated occurrences of Cu mineralization (less than 1% Cu) were reported from the West Klitdal/Scoresby Land prospecting but more abundant mineralised float was found within a drainage course and traced to a potential source associated with the emplacement of a dyke. Unfortunately this style of mineralization is typically restricted to the alteration halo around the dyke and hence has a low tonnage potential.

Some 60 samples (Appendix 1) were collected as representative hand specimens but none was submitted for further analysis.

10.2 Exploration Drilling

The Jameson Land Resources exploration programme was focused on sediment-hosted Cu deposits and had previously identified the Pingo Dal Formation as having favourable geology and occurrences of Cu mineralization. Target selection for drill holes was based on proximity to the basement contact, structural features inferred from geophysics and geochemical results. Target depths were planned to intersect the basement contact to ensure the complete stratigraphic column was tested (Table 2).

All drill holes (Appendix 2) were logged in detail in the field including magnetic susceptibility and geochemical measurements using a Niton portable XRF instrument at one meter intervals. A single point measurement by the Niton gave a 0.15% reading for the Cu content whereas all other readings were below the detection limit. Digital photographs of all core material were taken.

Table 2. – Jameson Land Resources Drillhole Summary

Drillhole Number	Latitude	Longitude	Start	Finish	EOH (m)
Mobilisation to IC-001			June 27/14	July 10/14	
DDH 14CEGC-IC-001	71,11679	22,36079	July 11/14	July 21/14	512.5m
DDH 14CEGC-IC-002	71,11522	22,40886	July 22/14	July 24/14	170.0m
DDH 14CEGC-IF-001	71,16182	22,36531	July 25/14	July 26/14	89.0m
DDH 14CEGC-IF-002	71,14435	22,36298	July 27/14	July 30/14	392.0m
DDH 14CEGC-CC-001	71,01674	22,39865	July 31/14	Aug 1/14	101.0m
DDH 14CEGC-CC-002	71,02440	22,39368	Aug 1/14	Aug 2/14	62.0m
DDH 14CEGC-CC-003	71,02741	22,45192	Aug 2/14	Aug 3/14	179.0m
DDH 14CEGC-CK-001	71,08053	22,44811	Aug 4/14	Aug 6/14	266.0m
Demobilisation to CNP			Aug 7/14	Aug 11/14	

N.B. Lat/Lon in WGS84

Overburden thickness was typically ~5 meters and no permafrost was encountered. Only rare minor structures such as fractures or clay seams were noted in drillholes. All casing was removed after the holes were completed (Figure 1).

Figure 1. Foraco 25HH Core Drill Set Up

The drilling results (Table 3) for the eight holes produced no visible Cu mineralization and virtually no sulphide mineralisation. Apart from the hematite observed throughout the sedimentary package there was no discernable alteration observed other than at the basement contacts in some drillholes. All drillholes intersected the target unit, Pingo Dal Formation arkoses and/or conglomerates.

Owing to the consistent low Cu content as measured by the Niton and absence of visible mineralization, no core samples were collected for geochemical analysis.

Table 3. – Summary Exploration Drill Logs

Drillhole ID	Interval (m)	Lithology and Comments
14CEGC-IC-001 (vertical)	0.0-6.0 6.0-85.7 85.7-509.6 509.6-512.5 (EOH)	Overburden Pingo Dal Fm Arkoses (all Klitdal Mbr) Pingo Dal Fm Conglomerates Arkoses
14CEGC-IC-002 (70°)	0.0-4.3 4.3-104.0 104.0-170 (EOH)	Overburden Gipsdalen Fm (mudstone/gypsum layers) Pingo Dal Fm (Klitdal Mbr) – arkoses
14CEGC-IF-001 (60°)	0.0-18.0 18.0-76.0 76.0-89.0 (EOH)	Overburden Pingo Dal Fm (Klitdal Mbr) - conglomerates Granite basement
14CEGC-IF-002 (vertical)	0.0-5.0 5.0-365 365-392.0 (EOH)	Overburden Pingo Dal (Klitdal Mbr) Granite basement
14CEGC-CC-001 (vertical)	0.0-4.0 4.0-21.1 21.1-88.4 88.4-101.0 (EOH)	Overburden Gipsdalen Fm (Kap Seaforth Mb) – elevated Zn to 0.4% Pingo Dal Fm (Klitdal Mb) Pink granite – carbonate/chloritic alteration
14CEGC-CC-002 (vertical)	0.0-8.0 8.0-53.8 53.8-62.0 (EOH)	Overburden Pingo Dal Fm - arkoses Granite
14CEGC-CC-003 (vertical)	0.0-5.0 5.0-64.1 64.1-157.6 157.6-179.0 (EOH)	Overburden Gipsdalen Fm (mudstone w/ gypsum stringers) Pingo Dal Fm (Klitdal Mb) oxid/reduced arkose w/ pyrite Granite – intense plg-chl-hem alteration at contact
14CEGC-CK-001 (75°)	0.0-4.8 4.8-36.5 36.5-154.9 154.9-241.3 241.3-266.0 (EOH)	Overburden Fleming Fjord Fm (red sandstone and mudstone) Gipsdalen Fm (mudstone with gypsum stringers) Pingo Dal Fm (mixed redbeds and pink arkoses) Granite – hematitic alteration at contact

11. Geophysics

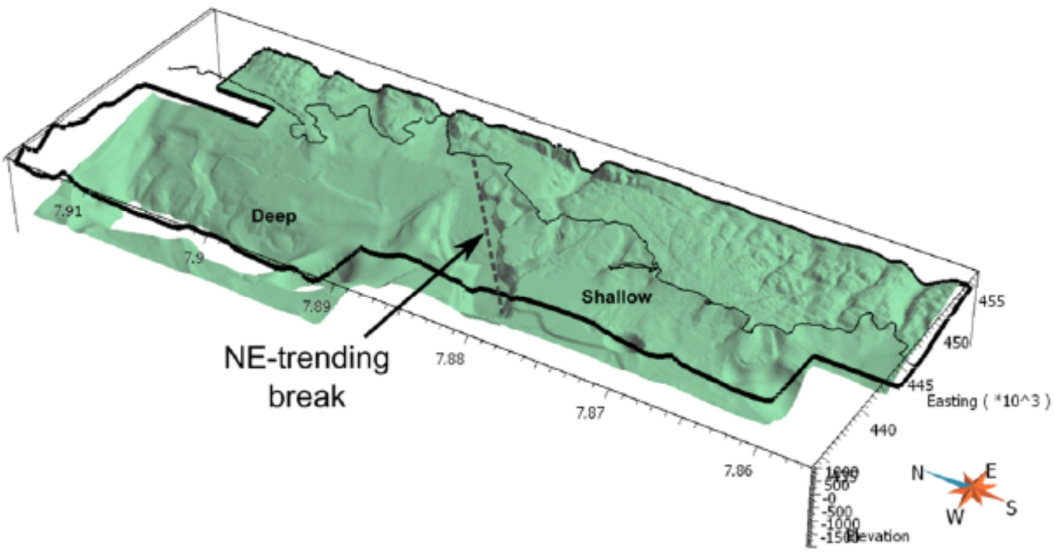
Three airborne geophysical surveys (Table 4) have been flown over the Jameson Land area providing important information about the subsurface geology and structure. The airborne surveys that were flown in 2013 were previously reported (Thomassen et al. 2014).

Table 4. – Summary of Jameson Land Basin Airborne Geophysics

Survey	Survey Date	Size (line-km)	Line Spacing (m)	Flight Line Direction
Fugro GEOTEM 1997	July 7 – Aug 24	14,622 line-km	400m	East-West
Fugro Aeromagnetic 2013	May 22 – June 6	10,171 line-km	200m	North-South
SkyTEM 2013	Sept 21-Oct 6	2,339 line-km	300m	East-West

The aeromagnetic datasets are most effective at identifying structural features such as lineaments, dykes, faults, etc. Inversion algorithms can accentuate these features, remove artifacts from the data and produce high confidence 3D images. Mira Geoscience (2014) was contracted to produce a 3D inversion of the available magnetic datasets and a geologically constrained model of the basement surface (Figure 2). Rock property measurements would normally be used to refine the model but none were available for the Klitdal area. Integrating this model with the topography, a depth to basement model was generated to assist the drilling and estimate the depth to the basement contact. The NE-SW boundary seen in the magnetic dataset is not apparent in either the topography or geology.

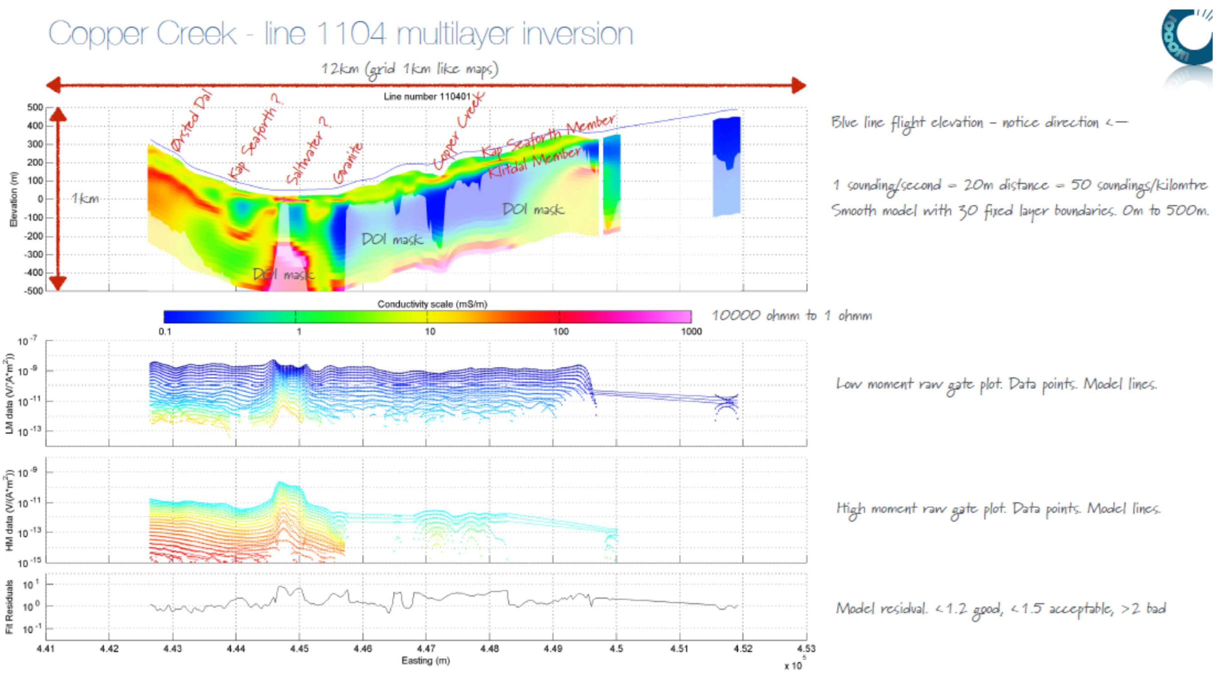
Figure 2. – 3D perspective view to the NE showing the top of modelled surface of the crystalline basement. The contact on the land surface between the basement and the sedimentary rocks is denoted by the wavy black line. The thick black line shows the boundary of the magnetic susceptibility model.



Because no previous drilling was undertaken in the region the only constraint on the basement surface was the contact with the exposed basement.

The SkyTEM time-domain EM data can generate high confidence conductivity models to great depths (e.g. >500m) under ideal circumstances. However in the absence of drill control, preliminary models should be refined as more information about the geology is acquired (Figure 3). In the Jameson Land licences, preliminary models were regarded to have low confidence due to challenges fitting the data to either “few layer” or “many layer” models. Netix (Sodemann 2014) determined that no distinct 3D features could be identified from the SkyTEM 1D inversion. The focus of the SkyTEM interpretation shifted to defining conductors in profiles and correlating them with the mapped geology. This approach was very speculative with inconsistencies and a lack of continuity between lines due to “IP” effects.

Figure 3. – 3D Inversion of SkyTEM data

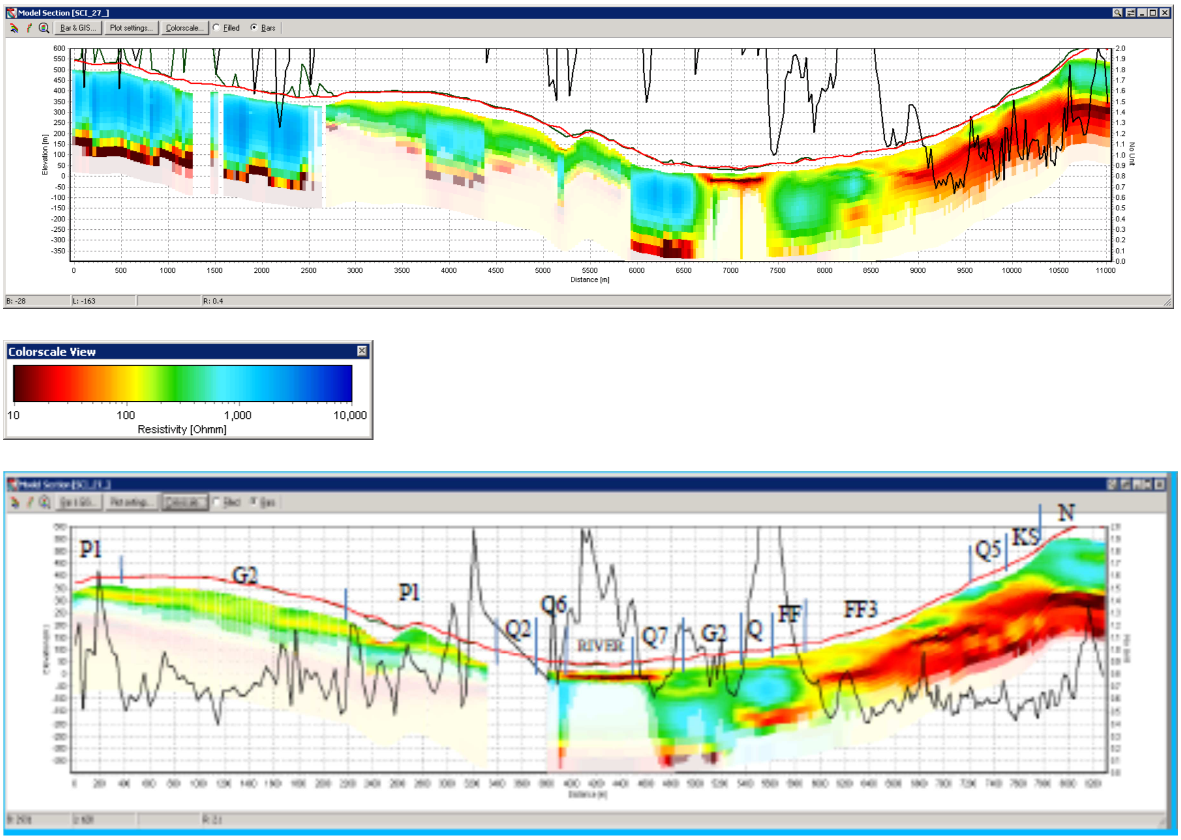


Furthermore SkyTEM data covering roughly 40% of the area of interest were subject to the **I**nduced **P**olarisation effects that were effectively uninterpretable. The IP effects were most pronounced in the western part of the survey area or towards the thicker sedimentary package and near the basement contact in the thinner sediments. Various standard methods were attempted to resolve the IP effects without success (Figure 4).

The research group at Aarhus Geophysics which has been investigating IP effects and their causative sources examined the Jameson Land data. Using proprietary software, Aarhus Geophysics attempted to resolve the IP effects and produce meaningful conductivity slices (Appendix 5) using a spatially constrained inversion. These IP effects are believed to be related to temperature variations (i.e. permafrost), mineralization or geology (e.g. gypsiferous units). Unfortunately the severely affected dataset could not be used to produce a model with any confidence level attached to it. The Aarhus Geophysics work is still at the research stage and not ready for routine processing of large airborne datasets.

Hence a drillhole was planned to test the causative source (e.g. thick permafrost, geological unit, etc) of the IP effects. The main objective was to acquire the complete stratigraphy to a depth of 250 meters within the area of most severe IP effects.

Figure 4. SCI results of Processing 1 (top) and Processing 2 (bottom). The bottom panel shows superimposed marked the geological formations outcrops and contacts The black line reports the data residual (misfit) to be read against the right axis.

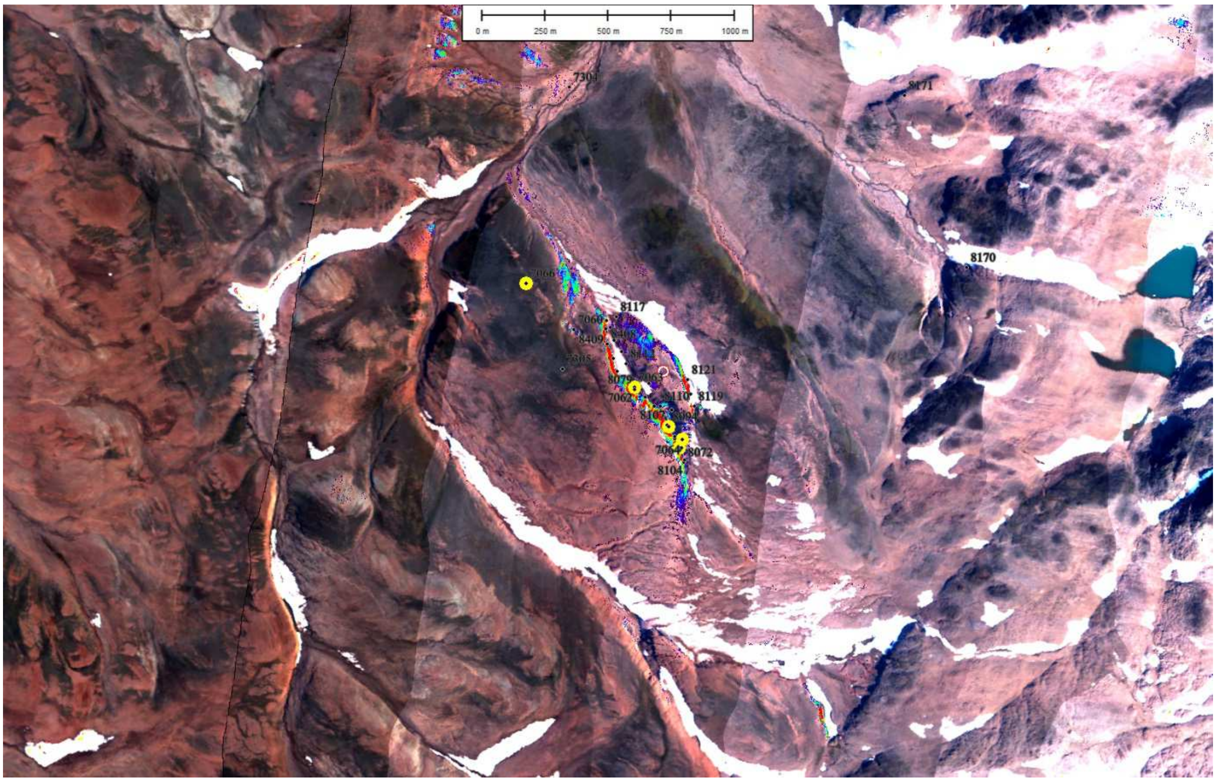


12. Remote Sensing

In August 2012, an airborne hyperspectral survey commissioned by GEUS was flown over the Jameson Land licences by the Natural Environmental Research Council (NERC) from the U.K. Between August 14 and 18, an aircraft with the Specmin Eagle and Hawk hyperspectral cameras collected VNIR and SWIR data, respectively over an area of approximately 2,600 sq. km.

The delay in processing and interpreting the dataset was related to acquisition problems that resulted in extremely large files. A hyperspectral specialist, David Coulter (Overhill Imaging Ltd) reviewed the dataset, making the appropriate corrections and provided an interpretation using mainly mineral mapping to identify areas of interest based on a sediment hosted Cu deposit model. Six dominant minerals; hematite, goethite, kaolinite, illite, calcite and dolomite were examined to assess any patterns of hydrothermal alteration. Strong correlations were noted for kaolinite and goethite with the Jurassic sediments and hematite with the Fleming Fjords redbeds. A strontianite response was also reported north of Devondal (Coulter 2014). A comprehensive report (Appendix 6) was produced identifying some 34 areas of interest for field crews to ground check. Interestingly, both Ice Cave Creek and Copper Creek areas were highlighted based on several parameters including illite chemistry and crystallinity (Figure 5). Lack of spectral response outside areas of exposed bedrock is likely due to glacial cover.

Figure 5. Ice Cave Mosaic showing illite spectral signature and geochemical results (yellow dots)



13. Interpretations and Conclusions

Avannaa's previous exploration has demonstrated widespread structurally-controlled and copper-dominated mineralisation along N–S-orientated lineaments in the basement rocks of noth-central Klitdal/westernmost Liverpool Land.

In the exploration model favored by Avannaa, the lineaments represent a system of listric border faults between the Jameson Land Basin and the Liverpool Land Horst, along which basinal brines are believed to have moved during dewatering of the basin, thereby forming the structurally-controlled sulphide mineralisation. In addition to dewatering during compaction, the widespread Tertiary magmatic activity was also a potentially ore-forming event which could either have triggered the original mineralising processes or have re-distributed previously formed sulphide accumulations.

Outcropping copper mineralisation in the basement is now known from five localities over an N–S distance of ~22 km (Thomassen et al. 2014). At the best exposed locality, Cu mineralisation seems to be controlled by older NNE–NE trending shear zones in the granite of a very limited extent. Chalcocite, chalcopyrite and pyrite are largely found in NE-orientated vein and joint systems, and in some cases disseminated in chlorite altered granites within the shear zones, on fractures in crush zones of fine grained granite but also disseminated in coarse grained granite. Shear zones are narrow ranging from 1 to 3 meters width. Given the apparent limited tonnage potential for this style of mineralization and absence of a defined drill target it was decided not to drill test the Triangle Showing in 2014.

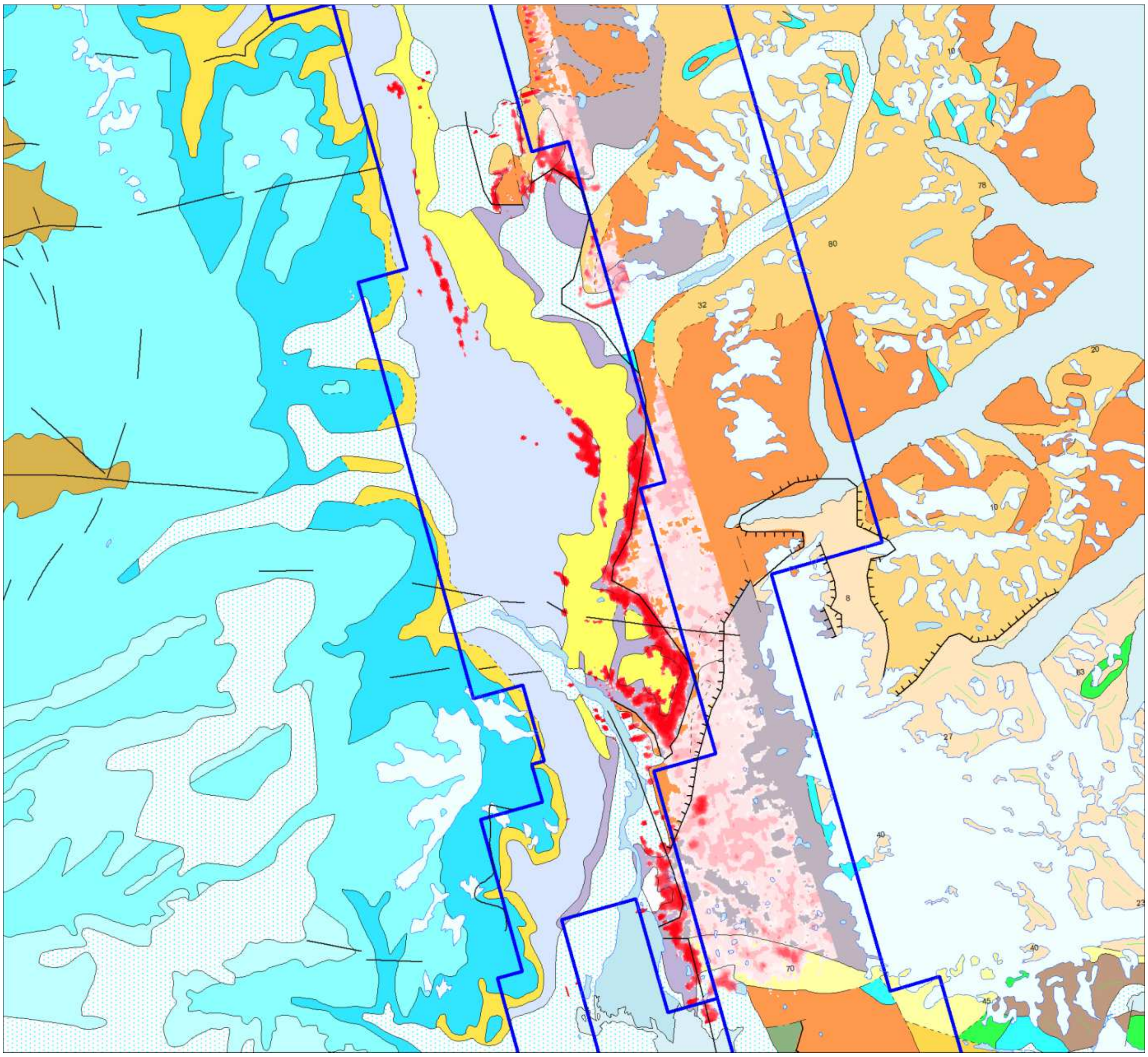
The sampling results for the Jameson Land licences demonstrated that Cu mineralization was widely distributed throughout the eastern Klitdal area. However the discontinuous copper mineralisation in outcrop and dispersed float samples were indicative that a Kupferschiefer-style or stratabound deposit was not evident. The drilling programme effectively confirmed that no laterally extensive sediment-hosted copper deposit exists in the eastern part of the Jameson Land Basin.

The objective of the second hole, 14CEGC-IC-002 of the 2014 drill programme was to test the causative source for the IP effects. Pending further petrophysical tests on selected core samples, the presence of the thick succession of Gipsdalen Formation gypsum laminae interfingered with mudstones is considered to have contributed to the IP effects. The distribution of the Gipsdalen Formation shows a good correlation with the area most affected by the IP effects (Figure 6).

The Cu mineralization found in 2013 in the Triaselv area is difficult to evaluate, as it is only known from float and poor outcrops. These imply stratabound copper-lead mineralisation at a level near the top of Paradigmabjerg Member arkoses. Although the copper concentrations encountered so far are modest, this is the first indication of stratabound mineralisation in the Triassic of the western border of the Jameson Land Basin.

The mineralised float discovered in the western part of the Jameson Land Basin in 2014 was associated with dyke emplacement. Previous occurrences of copper mineralisation in the west have hosted <1% Cu which diminishes its prospectivity for economic copper deposits.

Figure 6. – Distribution of IP Effected SkyTEM Data (Red) near Gipsdalen Formation Contact



14. Recommendations

Caledonian crystalline basement

Target: Structurally-controlled copper.

- Continued prospecting of western Liverpool Land/eastern Klitdal for copper-rich breccia zones comparable to the 1974 float.
- Geological mapping of western Liverpool Land/eastern Klitdal with special emphasis on structures, bedrock alterations and sulphide distribution.
- Detailed ground magnetic and EM/resistivity surveys over known mineralization and extended along favourable structures.

Triassic

Targets: Sandstone- and shale-hosted copper.

- No further work is proposed for the Triaselv–'Triaselv Extension' area.

15. References

Bengaard, H.-J. & Henriksen, N. 1984: Geological map of Greenland, 1:500.000, Scoresby Sund, Sheet 12, Copenhagen: Geological Survey of Greenland.

Caby, R. 1972: Preliminary results of mapping in the Caledonian rocks of Canning Land and Wegener Halvø, East Greenland. Rapport Grønlands Geologiske Undersøgelse **48**, 21–38.

Callomon, J.H., Donovan, D.T. & Trümpy, R. 1972: An annotated map of the Permian and Mesozoic formations of East Greenland. Meddelelser om Grønland **168/3, 35 pp.**

Clemmensen L.B. 1980a: Triassic rift sedimentation and paleogeography of central East Greenland. Bulletin Grønlands Geologiske Undersøgelse **136**, 72 pp.

Clemmensen L.B. 1980b: Triassic lithostratigraphy of East Greenland between Scoresby Sund and Kejser Franz Josephs Fjord. Bulletin Grønlands Geologiske Undersøgelse **139**, 56 pp.

Coe, K. & Cheeney, R.F. 1972: Preliminary results of mapping in Liverpool Land, East Greenland. Rapport Grønlands geologiske Undersøgelse 48, 7–20.

Collinson, J.D. 1972. The Røde Ø conglomerate of inner Scoresby Sund and the Carboniferous (?) and Permian rocks west of Schuchert Flod. A general sedimentological account. Bulletin Grønlands Geologiske Undersøgelse **102**, 48 pp.

Coppard, J. 1991. Report on fieldwork carried out on Jameson Land South and Kap Brewster. June to August 1991. Internal report, RTZ Mining and Exploration Limited 14 pp. 3 app. (in archives of Geological Survey of Denmark and Greenland, GEUS Report File 21083).

Coulter, D. 2014: Report on the analysis of hyperspectral imagery for the Carlsberg Fjord area, Greenland. Internal report, Avannaa Resources Limited, 57 pp.

Cox, D.P., Lindsay, D.A., Singer, D.A., Moring, Barry, and Diggles, M.F., 2003, revised 2007, Sediment-hosted copper deposits of the world – Deposit models and database: U.S. Geological Survey Open-File Report 03-107, v. 1.3, 53 p. and databases.

Fugro Airborne Surveys 2013: LOGISTICS AND PROCESSING REPORT. Airborne High Resolution Gradient Magnetic Survey, East Greenland Copper Project,Klitdal & Wegener-Halvo Blocks, GREENLAND. Internal report, prepared by Fugro Airborne Surveys for Jameson Land Resources A/S, 19 pp.

Haller, J. 1971: Geology of the East Greenland Caledonides, 415 pp. London and New York: Interscience Publishers.

Harpøth, O. 1980: Field work in southern Wegener Halvø East Greenland. Detailed investigation of Upper Permian mineralisation in the Quensel Bjerg area and geochemical soil sampling of Klitdal member (Lower Triassic). Internal report, Nordisk Mineselskab A/S.

Vol. 1+2, 60 pp. (in archives of Geological Survey of Denmark and Greenland, GEUS Report File 20706).

Harpøth, O. 1982: Prospecting in Karstryggen, central Traill Ø, Broget Dal, Bersærkerbræ and Canning Land, central East Greenland, NM 3/81. Internal report, Nordisk Mineselskab A/S, 76 pp. (in archives of Geological Survey of Denmark and Greenland, GEUS Report File 20723).

Harpøth, O., Pedersen, J. L., Schønwandt, H. K. & Thomassen, B., 1986: The mineral occurrences of central East Greenland. Meddr Grønland Geosci. **17**, 138 pp., 1 plate.

Henriksen, N. 1971: Dagbog 1971, Niels Henriksen, Scoresby Sund (Liverpool Land) . Unpublished report, Geological Survey of Greenland, 88 pp.

Henriksen, N. 2008: Geological History of Greenland. Four billion years of Earth evolution. Geological Survey of Denmark and Greenland, Copenhagen, 272 pp.

Henriksen, N., Higgins, A.K., Kalsbeek, F. & Pulvertaft, T.C.R. 2009: Greenland from Archaean to Quaternary. Descriptive text to the 1995 Geological map of Greenland 1:2 500 000. 2nd edition. Geological Survey of Denmark and Greenland Bulletin **18**, 126 pp.

Higgins, A.K., Gilotti, J.A. & Smith, M.P. (eds) 2008: The Greenland Caledonides: evolution of the northeast margin of Laurentia. Geological Society of America Memoir **202**, 368 pp.

Kempter, E. 1961: Die jungpaläeozoischen Sedimente von Süd-Scoresby Land (Ostgrönland, 71½°N), mit besondere Berücksichtigung der kontinentalen Sedimente. Meddelelser om Grønland **164,1**, 123 pp.

Kivinen, A. 2013: Brief notes on Maxmin survey at target Triangle. Internal report, Electromagnetic Imaging Technology,1 pp., 14 figures.

Larsen, P.-H., Olsen, H. & Clack, J.A., 2008: The Devonian basin in East Greenland – review of basin evolution and vertebrate assemblages, *in* Higgins, A.K., Gilotti, J.A. & Smith, M.P. (eds), The Greenland Caledonides: Evolution of the Northeast Margin of Laurentia. Geological Society of America Memoir **202**, 273–292.

Lehnert-Thiel, K. & Walser, P. 1968: Montangeologisher Bericht, Nordmine 1968. Über die Gebiete der Wegener- Halbinsel das nordwestliche Gebiet des Canning-Landes und den SE-Teil der Traill Ö, NM 5/68. Internal report, Nordisk Mineselskab A/S, 62 pp. (in archives of Geological Survey of Denmark and Greenland, GEUS Report File 20693).

Mikkelsen, N., Jepsen, H.F., Ineson, J.R., Piasecki, S.,von Platen-Hallermund, F., Schjøth, F., Thomassen, B. & Weng, W.L. 2005: Thematic maps and data of North and Northeast Greenland: geology, mineral occurrences and hydrocarbons. Danmarks og Grønlands Geologiske Undersøgelser Rapport **2005/28**, 56 pp., 1 DVD included.

Mira Geosciences 2014: Inversion of magnetic data at Central East Greenland Copper Project: Wegner-Halvo and Klitdal Blocks. Report Number 4184, Prepared for Avannaa Resources Limited, 75 pp.

Pebal 1969: Prospektionsbericht Nordmine 1969 über die Gebiete der Wegener Halbinsel und um das Carlsberg fjord. Internal report, Nordisk Mineselskab A/S, 18 pp. (In archives of Geological Survey of Denmark and Greenland, GEUS Report File 20747).

Pedersen, J. 1980: 8/80. Report on geological field work 1980 Nordisk Mineselskab A/S. Internal report, Nordisk Mineselskab A/S, 32 pp. (In archives of Geological Survey of Denmark and Greenland, GEUS Report File 20719).

Pedersen, M. 1999: Gis compilation of geoscience data: an ArcView GIS version of partly unpublished data from Wegener Halvø, central East Greenland. Danmarks og Grønlands Geologiske Undersøgelse Rapport **1999/37**, 14 pp., 1 CD-ROM.

Schønwandt, H. K. 1980: Prospektering i trias-sedimenterne i Klitdal-Passagen Området, NM 2/75. Internal report, Nordisk Mineselskab A/S, 23 pp. (in archives of Geological Survey of Denmark and Greenland, GEUS Report File 20660).

SkyTEM 2013: SkyTEM Survey: Klitdal-Wegener, Greenland. Data report. Internal report, prepared by SkyTEM Surveys ApS for Avannaa Resources Ltd., 35 pp.

Sodemann, C.H. 2014: Klitdal Target Inversion – 2013 AEM Survey. Presentation prepared for Avannaa Resources Limited.

Stemp, R.W. 1998: Airborne electromagnetic and magnetic survey of the northern Jameson Land area, central East Greenland. Results from project AEM Greenland 1997. Danmarks og Grønlands Geologiske Undersøgelser Rapport **1998/18**, 42 pp.

Surlyk, F., Hurst, J.M., Piasecki, S., Rolle, F., Scholle, P.A., Stemmerik, L. & Thomsen, E. 1986: The Permian of the western margin of the Greenland Sea – A future exploration target. In: Halbouty, M.T. (ed.) Future petroleum provinces of the world. American Association of Petroleum Geologists Memoir **40**, 629–659.

Taylor S. R., & McLennan S. M. 1995: The geochemical evolution of the continental crust. Reviews of Geophysics **33**, 241–265.

Thomassen, B. 1973: Heavy metal content of the Posidonia Shales on Wegener Halvø. Rapport Grønlands Geologiske Undersøgelse **58**, 33–35.

Thomassen, B. 1975: Prospecting report 1974. Stratabound permo-triassic copper-lead-zinc-mineralizations at the eastern border of the Jameson Land Bassin, NM 8-9/74. Internal report, Nordisk Mineselskab A/S. Vol. 1+2, 98 pp.(in archives of Geological Survey of Denmark and Greenland, GEUS Report File 20658).

Thomassen, B. 1976: Prospektions rapport 1975. Fortsatte undersøgelser af de lagbundne Permo-Triassiske mineraliseringer i det nordøstlige Jameson Land, NM 1/76. Internal report, Nordisk Mineselskab A/S. Vol. 1+2, 60 pp.(in archives of Geological Survey of Denmark and Greenland, GEUS Report File 20666).

Thomassen, B. 1979: Prospecting of the Permo-Triassic sediments of the Fleming Fjord, Mesters Vig and SW Traill Ø areas, East Greenland, NM 5/76. Internal report, Nordisk Mineselskab A/S, 84 pp. (in archives of Geological Survey of Denmark and Greenland, GEUS Report File 20663).

Thomassen, B. 1980: Prospecting of the Permian sediments of the Wegener Halvø, Mesters Vig South and Schuchert Dal areas, East Greenland, NM 1/79. Internal report, Nordisk Mineselskab A/S. Vol. 1+2, 70 pp. (in archives of Geological Survey of Denmark and Greenland, GEUS Report File 20704).

Thomassen, B. 1982: Prospecting for Cu-Pb-Zn-Au-Ag in the Clavering Ø, Giesecke Bjerge and Canning Land areas, NM 1/81. Internal report, Nordisk Mineselskab A/S, 59 pp. (in archives of Geological Survey of Denmark and Greenland, GEUS Report File 20703).

Thomassen, B. 2012: Technical report on mineral exploration on Liverpool Land and Traill Ø, central East Greenland. Internal report, Avannaa Exploration Ltd., 33 pp.

Thomassen, B. & Tukiainen, T. 2008: Ground check of airborne hyperspectral anomalies in the greater Mesters Vig area, central East Greenland. Danmarks og Grønlands Geologiske Undersøgelse Rapport **2008/14**, 85 pp.

Thomassen, B. & Tukiainen, T. 2009: Nordmine Archives: Part 1. Digital geological and geochemical data from Nordisk Mineselskab A/S' mineral exploration in central East Greenland 1968–83. Danmarks og Grønlands Geologiske Undersøgelse Rapport **2009/71**, 16 pp., 1 DVD.

Thomassen, B. & Rehnstrom, E. 2014: Mineral Exploration 2014 in the western part of the Jameson Land Basin, Central East Greenland. Internal report, Avannaa Exploration Ltd., 42 pp.

Thomassen, B. & Rink, M. 2013: Technical Report on mineral exploration in North Jameson Land, central East Greenland. Internal report, Avannaa Exploration Ltd., 78 pp.

Thomassen, B., Rink, M. & Stelter, S. 2014: Technical Report on mineral exploration in North Jameson Land, central East Greenland. Internal report, Avannaa Exploration Ltd., 102 pp.

Thomassen, B., Clemmensen, L.B. & Schønwandt, H.K. 1982: Stratabound copper-lead-zinc mineralisation in the Permo-Triassic of central East Greenland. Bulletin Grønlands Geoloe Undersøgelse **143**, 42 pp.

Tukiainen, T. & Thomassen, B. 2010: Application of airborne hyperspectral data to mineral exploration in North-East Greenland. Geological Survey of Denmark and Greenland Bulletin **20**, 71–74.

Viezzoli, A. & Menghini, A. 2014: Inversion of SkyTEM data from Klitdal, Greenland with IP Modelling. Aarhus Geophysics ApS Short Report # 2014_07, Prepared for Jameson Land Resources, 75 pp.

Wright, J. V., Olsen, H. K. & Rothery, E. 1992: Results of 1992 field programme exploration Pasminco Exploration, 25 pp., 3 app., 8 plates (in archives of Geological Survey of Denmark and Greenland, GEUS Report File 21298).

16. Date and Signature Page

Copenhagen, 1. November 2014

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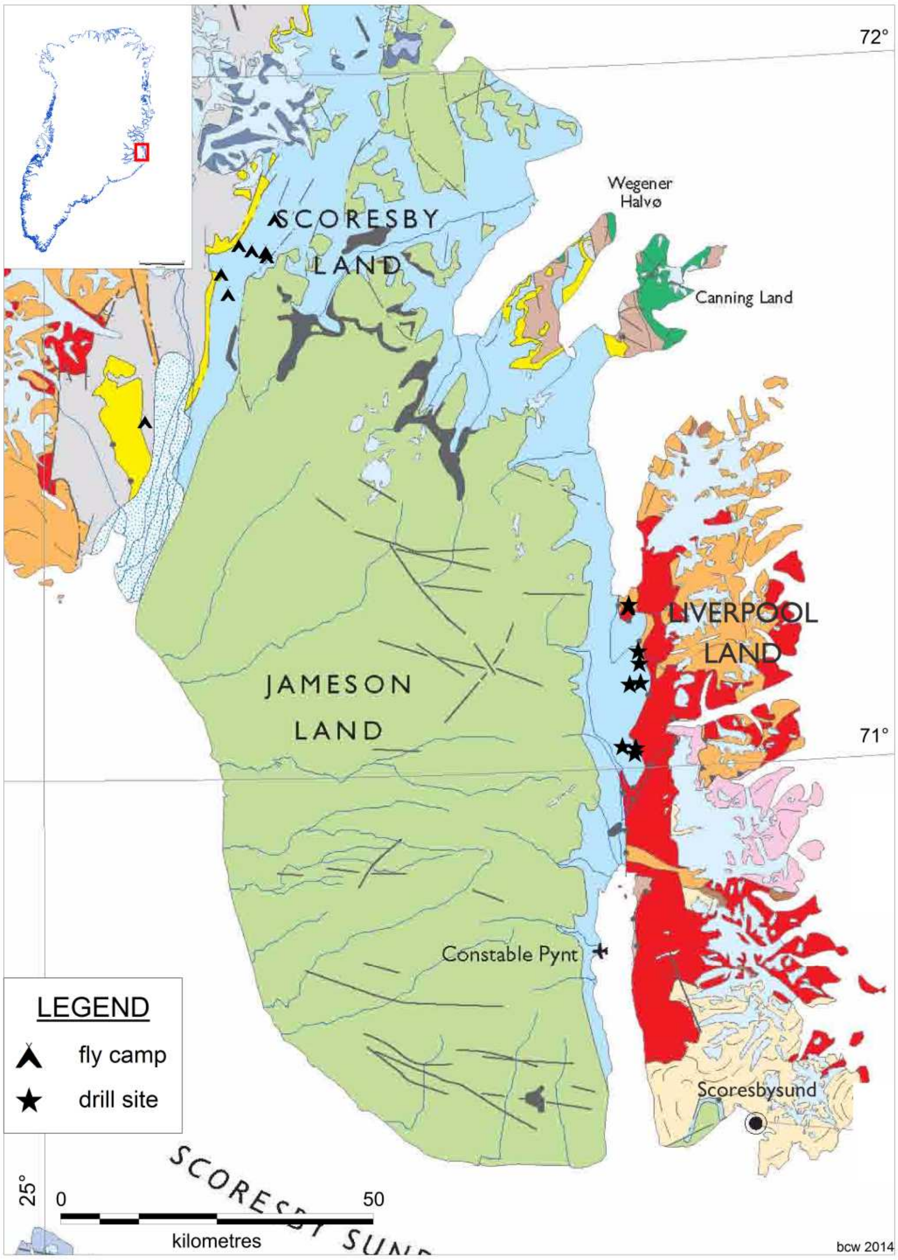
17. Illustrations

Map 1. Location Map of Jameson Land Resources Property



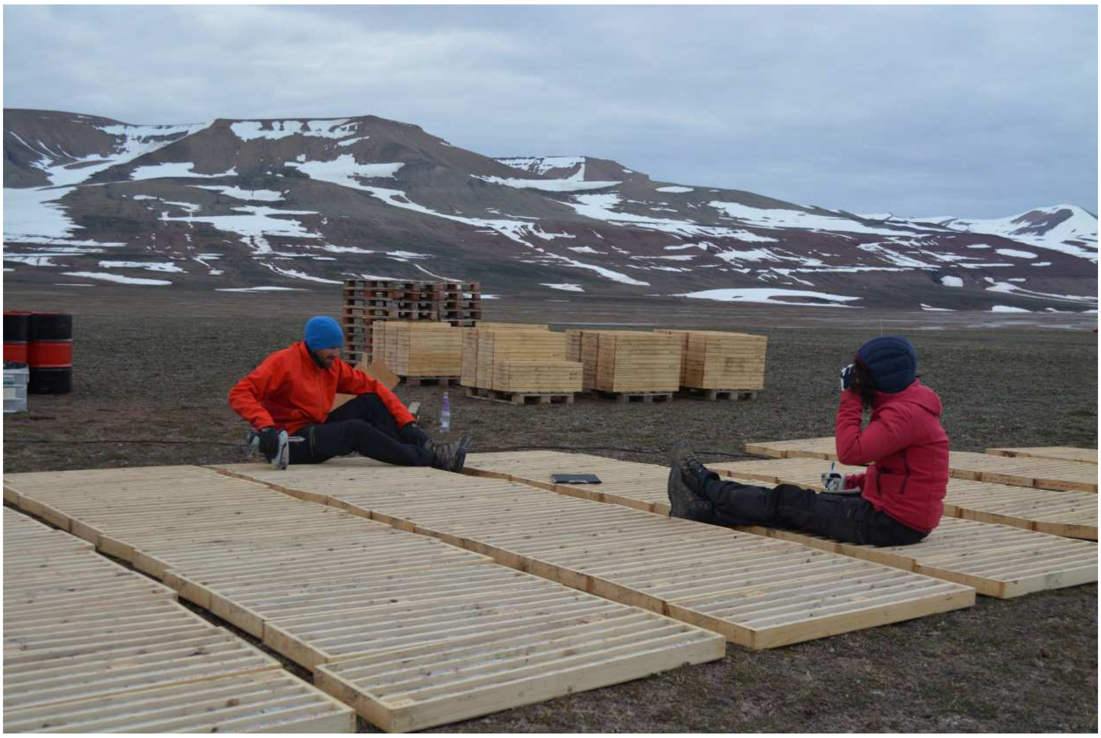


Figure 7. – Detailed Core Logging and Core Storage at Base Camp

Figure 8. – Drill Set Up with Water Pump

Figure 9. – Foraco 25HH Drill Setup

18. Appendices

1. Exploration Drilling Programme, Jameson Land Basin – S. Stelter
2. Mineral Exploration 2014 in the western part of the Jameson Land Basin, Central East Greenland – B. Thomassen & E. Rehnstrom
3. Inversion of magnetic data at Central East Greenland Copper Project: Wegner-Halvo and Klitdal Blocks – Mira Geoscience
4. Klitdal Target Inversion – 2013 AEM Survey – C. Sodemann
5. Inversion of SkyTEM data from Klitdal, Greenland with IP Modelling – A. Veziolli & A. Menghini
6. Report on the analysis of hyperspectral imagery for the Carlsberg Fjord area, Greenland – D. Coulter
7. Structural mapping in the Jameson Land Basin - P. Guarnieri & A. Brethes