

# Executive Summary: Kangerluarsuk Zn-Pb-Ag ( $\pm$ Cu-Ge) Project

- The Kangerluarsuk Project consists of **two 100% owned mineral exploration licences totalling 692 sq-km** located within the Karrat Group, a major Paleoproterozoic metasedimentary basin with abundant Zn-Pb-Ag  $\pm$  Cu showings. In 2020 Bluejay increased its landholdings at Kangerluarsuk five-fold owing to the potential the company recognises within the Karrat Group for large scale base metal deposits.
- An area with a recent history of mining. **The project is situated only 12 km north of the former Black Angel Zn-Pb-Ag mine** that is acknowledged as Greenland's most profitable to date, producing 11.2 MT @ 12.6 % Zn, 4.1 % Pb and 29 g/t Ag between 1973-1990 during production by Cominco (now Teck) and later Boliden. Kangerluarsuk is located in a geologically favourable sub-basin previously targeted by Rio Tinto Zinc (RTZ) and Cominco.
- Prospecting by RTZ located several locations with outcropping high-grade mineralisation with grab samples up to **41% Zn, 9.3% Pb, 1.2% Cu and 596 g/t Ag** and chip sampling profiles assaying **45.4% Zn over 0.4 metres** and **41.1% Zn over 1 meter** within Bluejay's licence areas. **Never drill tested.**
- Bluejay's licence areas are acknowledged by the Geological Survey of Denmark and Greenland as the **strongest cluster of stream sediment zinc anomalies in the whole of Greenland**. Multiple-metal anomalies in stream sediments and heavy mineral concentrates indicates the presence of polymetallic deposits.
- The exploration targets are one or more high-grade, large tonnage, stratabound, sedimentary-hosted Zn-Pb-Ag  $\pm$  Cu deposits. Similar geological environments have yielded some of the world's most valuable base metal occurrences including deposits within the Selwyn Basin, Yukon (e.g., Sullivan, 162mt @ 5.9% Zn and 6.1% Pb) and Rammelsberg, Germany (25mt @ 18.1% Zn, 8.6% Pb and 1.1% Cu).

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- **Data-rich:** work on the property to date has included trench and channel sampling; detailed structural and geological mapping; MMI (Mobile Metal Ion), SGH (Spatiotemporal Geochemical Hydrocarbon) and bulk soil geochemistry; biogeochemical sampling; fixed-wing FALCON® Airborne Gravity Gradiometer ('AGG'), magnetic and LIDAR survey; helicopter-borne DIGHEM-V and ZTEM surveys; and a pilot reflection seismic survey.
- Potential for a large-scale system: intense geochemical anomalies identified along a >15 km NE-SW strike length.
- **Drill-ready:** multiple high priority drill targets identified, including highly conductive bodies identified by geophysics close to the modelled Archean basement contact, which are coincident with the strongest surface geochemical anomalies. Verification by several independent methods has pinpointed exploration targets that are now ready to be drill-tested through a maiden drill programme in summer 2023 (the first time the property will have been drill-tested).

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- Easily accessible area, located on a relatively flat plateau at the head of the deep-water Kangerluarsuk Fjord (ice-free for the majority of the year), at an elevation of ca. 500 - 770 m facilitating straightforward access for future drilling. The project is close to existing infrastructure at the former Black Angel Mine camp.
- **Funding for the 2023 maiden drill programme has now been secured**, under the recently announced \$6 million USD Institutional Equity Subscription by Towards Net Zero LLC (see [RNS dated 14 February 2023](#)). The first tranche of \$2 million USD has now been received by Bluejay.
- Full details of the planned maiden drill programme and the associated regional field programme (stream sediment, scree sediment and heavy mineral concentrate sampling; channel sampling of outcropping mineralisation; and geological mapping) will be discussed in subsequent RNS and a second technical presentation to be released by Bluejay ahead of the 2023 field season.

# Zinc outlook

- **Strong outlook:** chronic shortages in zinc supply are forecasted. Depletion of many major zinc mines, coupled with limited new mine developments is leading to a nascent bull market for zinc.
- **Global stimulus incoming:** fiscal stimulus will focus on infrastructure which is bullish for zinc.
- **Increasing recognition of zinc as a critical metal** (see next slide): geopolitical conflict and resource nationalism are fuelling critical metal focus.

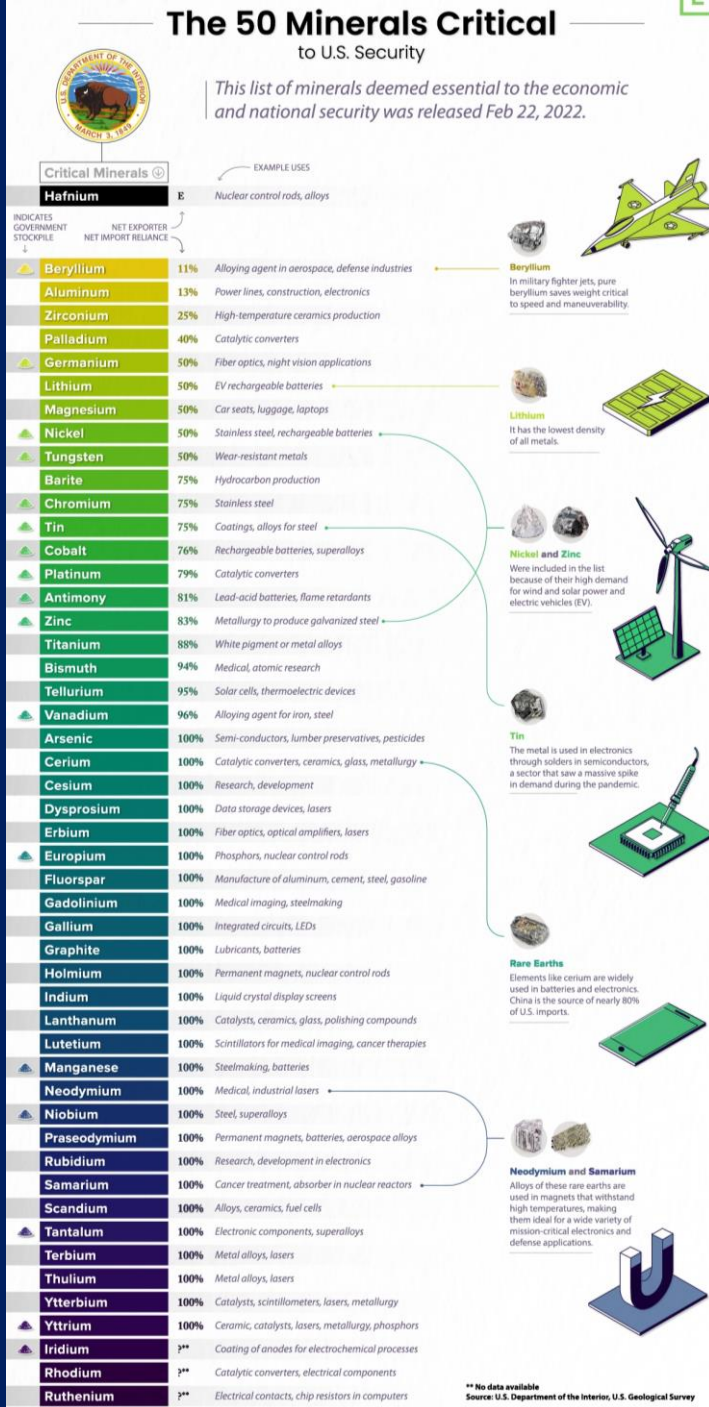
Zinc metal price 2018 - present

(figure from: London Metals Exchange)



# U.S. Critical Minerals List, 2022

(figure from: Visual Capitalist)

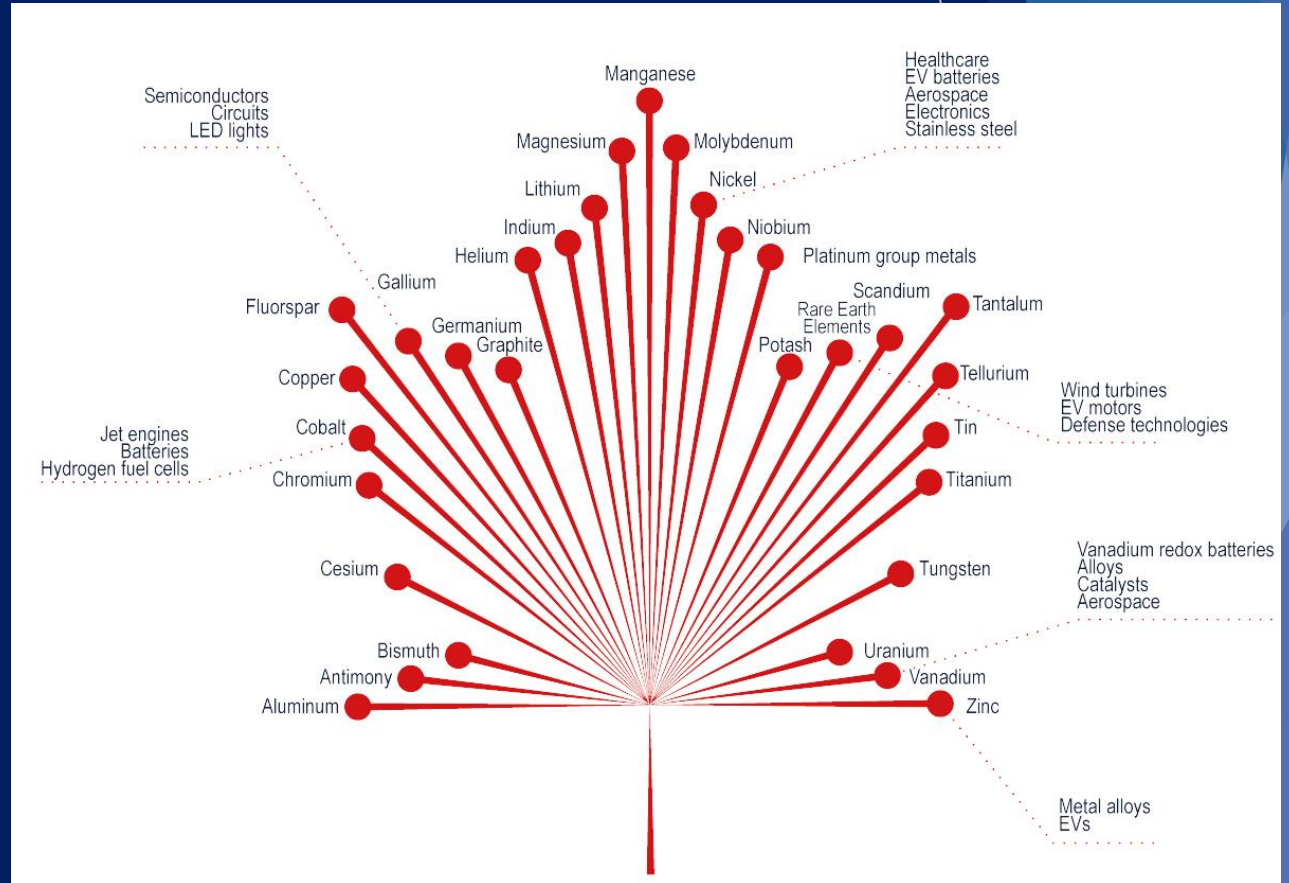


# Zinc outlook

- **Zinc** for the first time included in both the US and Canada's most recent Critical Minerals Lists (minerals deemed essential to their economies and national security, whilst also facing significant supply risk).
- **Germanium** is also considered a critical mineral by the US, Canada, UK and EU. Recent mineralogical work for Kangerluarsuk (and Black Angel) indicates a previously unrecognised potential for germanium associated with the Zn-Pb-Ag mineralisation.

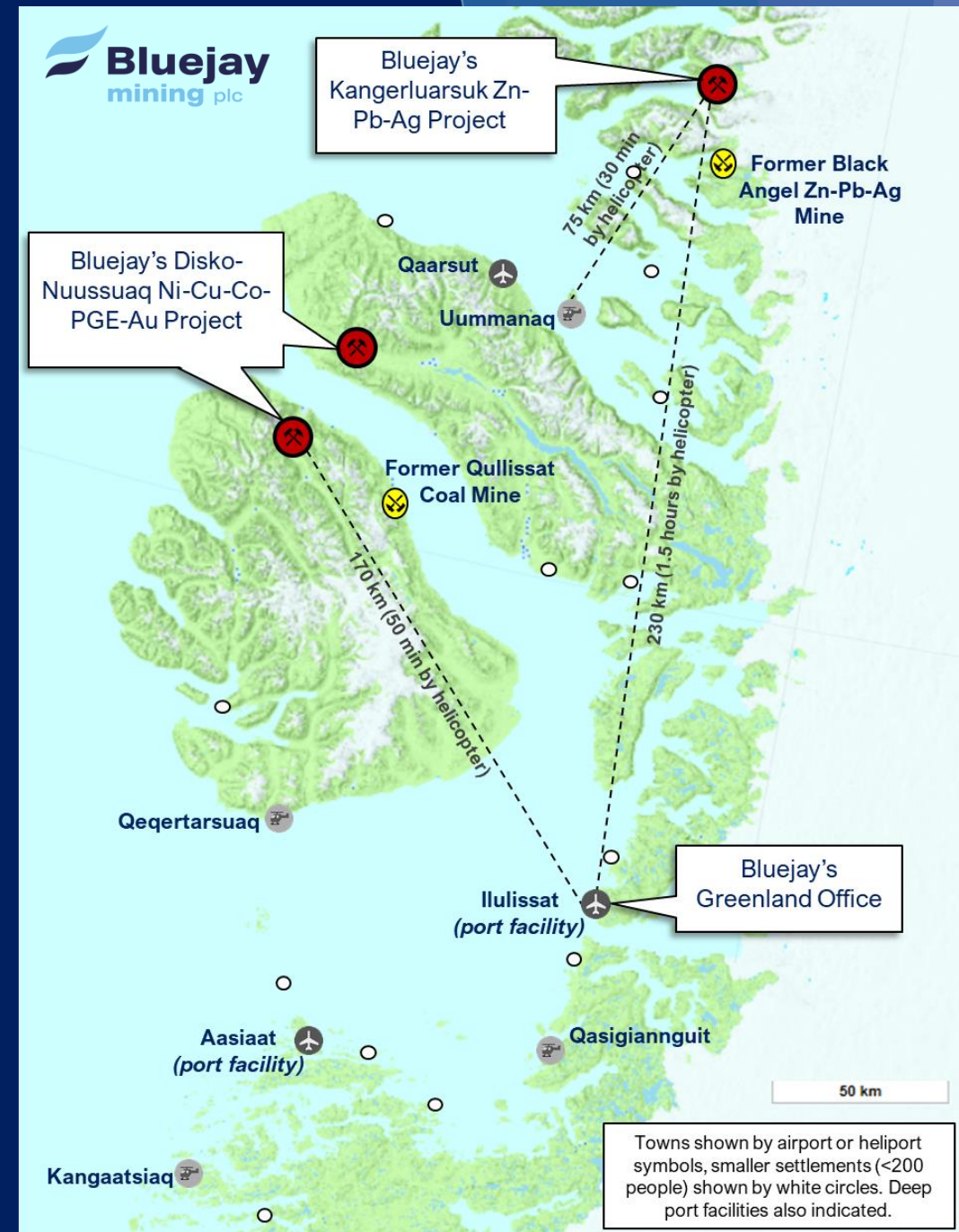
# Canada Critical Minerals List, 2021

(figure from: The Canadian Critical Minerals Strategy report)



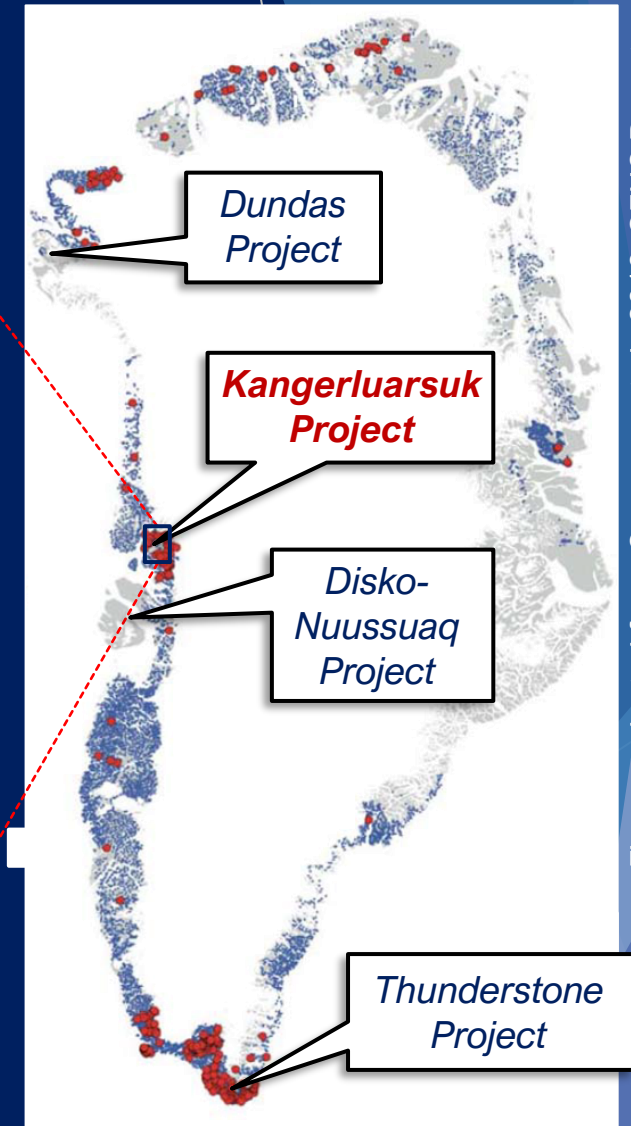
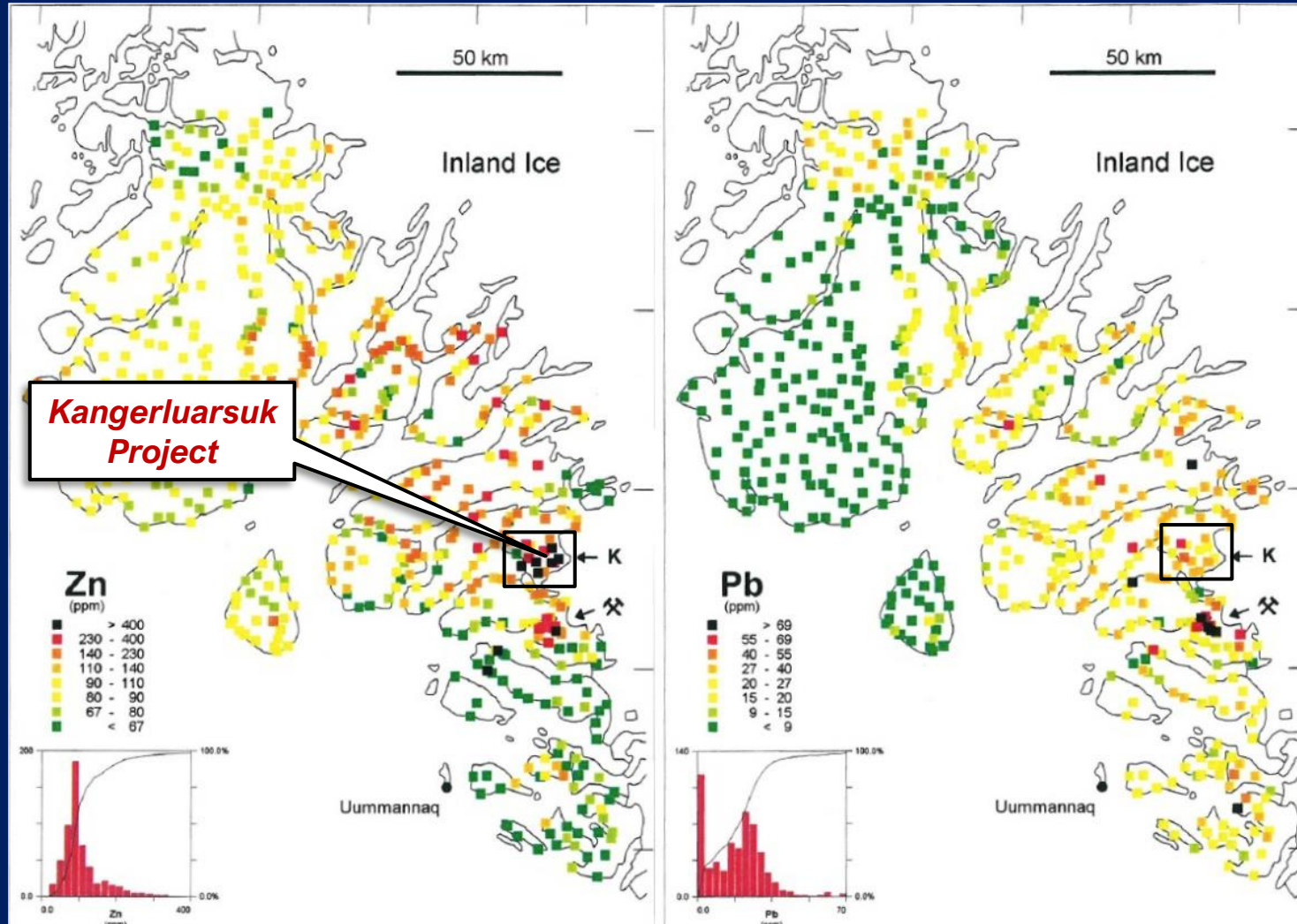
# A trusted partner in West Greenland

- Bluejay has a strong local presence in Central West Greenland through its 'logistical hub' based in Ilulissat (the capital of North Greenland) which includes a permanent office and warehousing facilities.
- Bluejay has been operating in the region for many years and has excellent relations with a wide range of suppliers and contractors. **We are a well-known and trusted customer/partner/ employer in the region.**



# Bluejay's licence (MEL 2011/31) contains the strongest cluster of stream sediment zinc anomalies in the whole of Greenland!

Figures adapted from: Steenfelt, 1998, GEUS Report

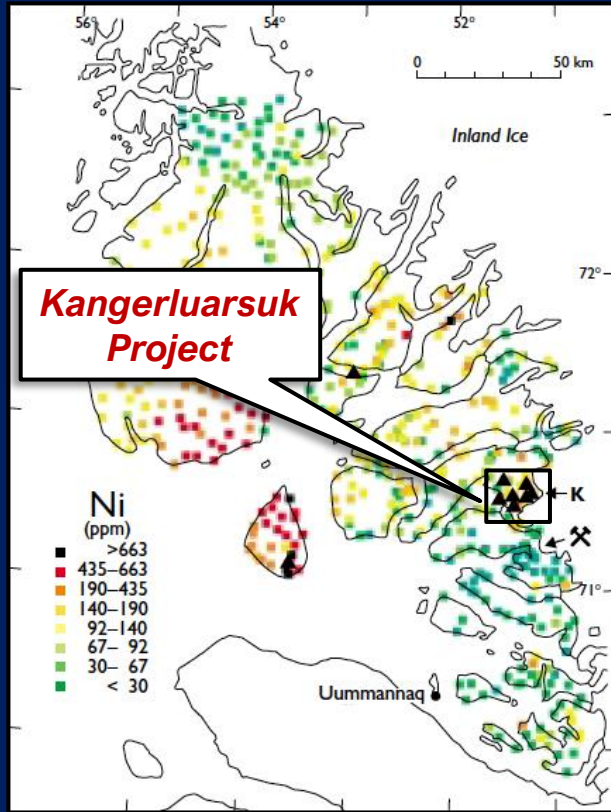


Figures adapted from: Sørensen et al., 2013, GEUS Report

- GEUS stream sediment sample locations (n = 12027)
- GEUS stream sediment zinc > 200 ppm (n = 381)

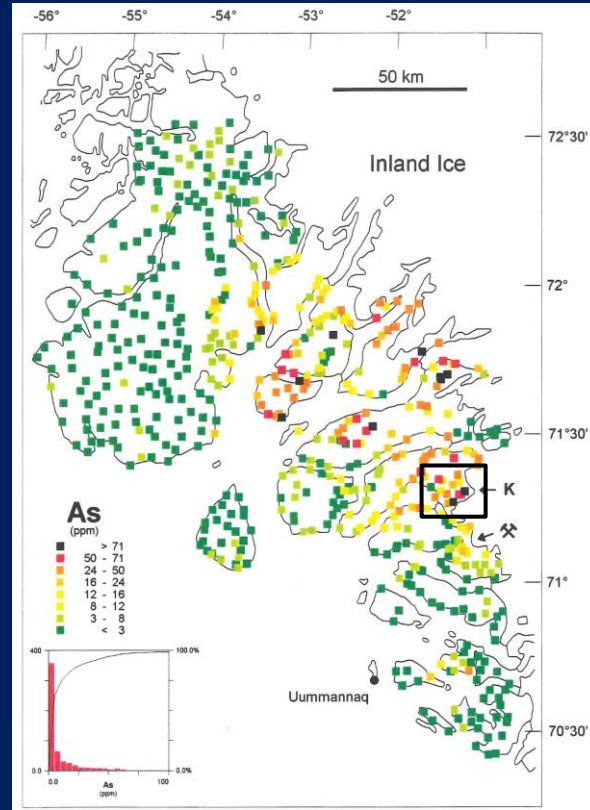
# Multiple-metal and pathfinder anomalies in stream sediments and heavy mineral concentrates indicates the presence of polymetallic deposits at Kangerluarsuk

Figures adapted from: Steenfelt, 1998, GEUS Report

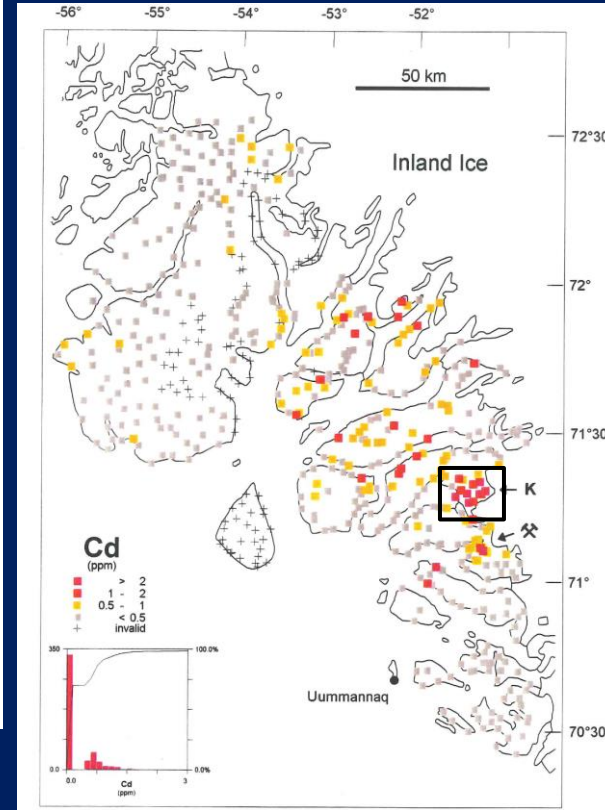


**Ni**

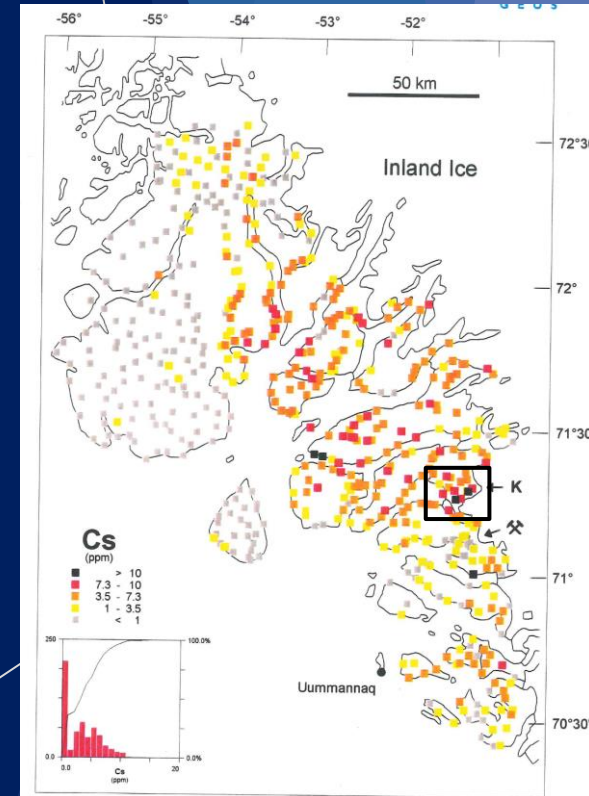
Note for Ni the left-hand side of the map relates to the West Greenland flood basalt province, hence the high Ni values. Kangerluarsuk is the strongest cluster of Ni anomalies in the Karrat Group. The cause of the Ni anomalism is as yet unexplained.



**As**



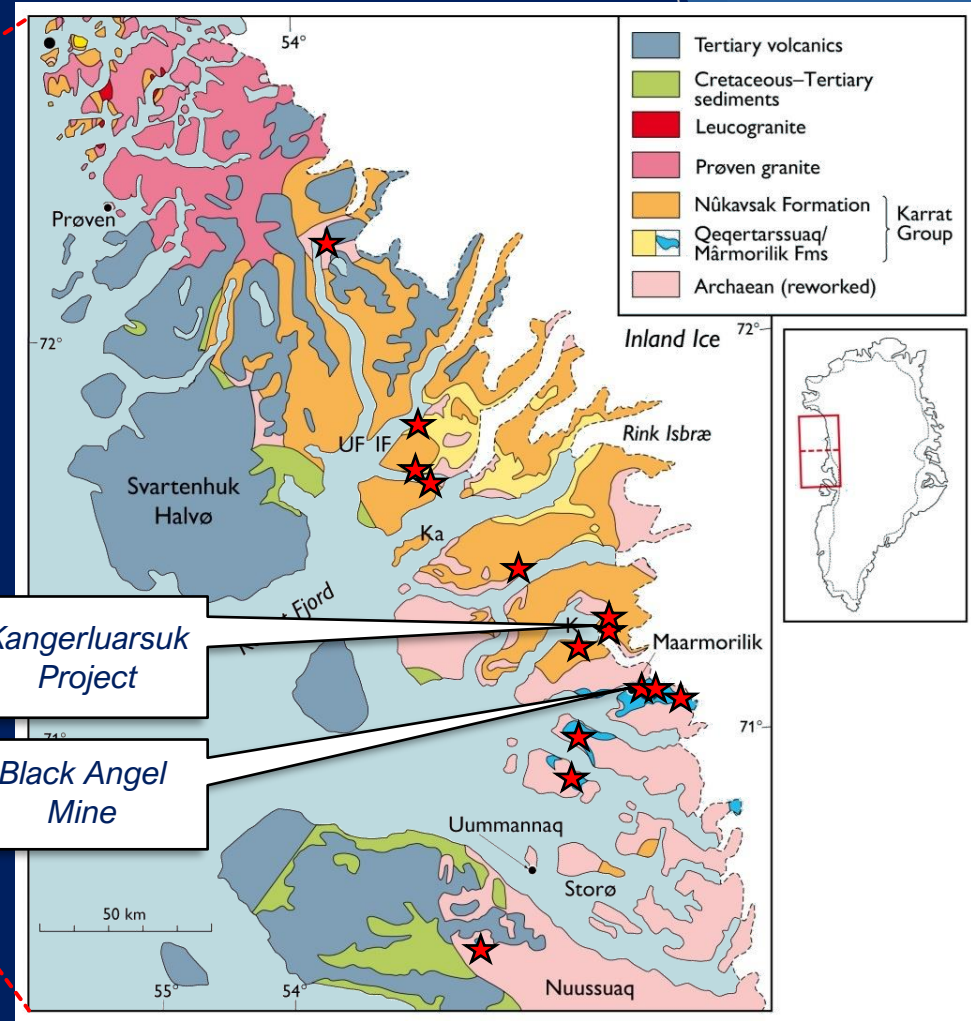
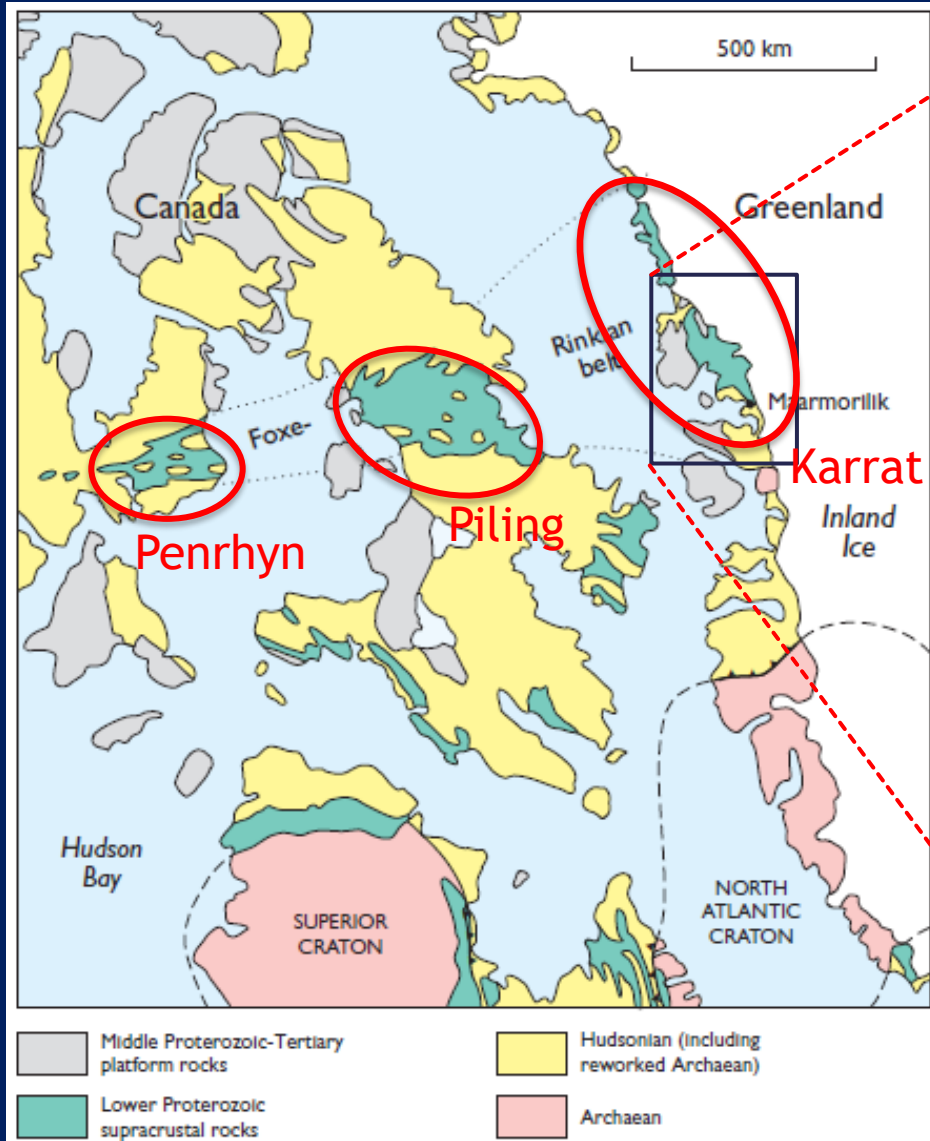
**Cd**



**Cs**



# Geological Setting: Karrat Group



The Uummannaq District, Central West Greenland showing the southern portion of the Paleoproterozoic Karrat Group meta-sedimentary basin. Stars show known Zn-Pb mineral occurrences.

The project is located within the Palaeoproterozoic Karrat Group, an important Zn-Pb basin. The Karrat Group correlates with the Foxe Belt in NE Canada (Penrhyn and Piling Groups).

- The ~8.5 km thick Paleoproterozoic Karrat Group metasedimentary sequence deposited after 2.0 Ga that extends from ~71° to ~75°N and is composed of the **Qaarsukassak**, **Mârmorilik**, **Kangilleq**, and **Nûkavsak** formations. It is exposed over a N-S distance of ca. 550 km and covers an area of >10,000 sq km.
- The lower part of the Karrat Group is represented by the Qaarsukassak and Mârmorilik formations. Both formations are overlain by the Nûkavsak fm. which is intercalated with metavolcanic rocks of the Kangilleq fm.
- The **Qaarsukassak fm.**, (see later slides) is a recently defined formation comprising of siliciclastic and carbonate rocks. Hosts the Zn-Pb-Ag mineralisation at Bluejay's Kangerluarsuk project
- The **Mârmorilik fm.**, is dominated by calcite and dolomite marble; fine-grained locally graphite-bearing schist; quartzite; and metamorphosed evaporites in the form of anhydrite. Hosts the Zn-Pb-Ag mineralisation at the Black Angel Mine.
- The ~5000 m thick **Nûkavsak fm.**, contains metagreywacke and metapelite, which are interpreted as turbidite flysch sequence. Locally contains pyrrhotite-chert-graphite horizons.
- Based on new geochronology data the former Qeqertarsuaq fm. (Henderson and Pulvertaft, 1987), has been removed from the Karrat Group and included in the Neoproterozoic gneiss complexes.

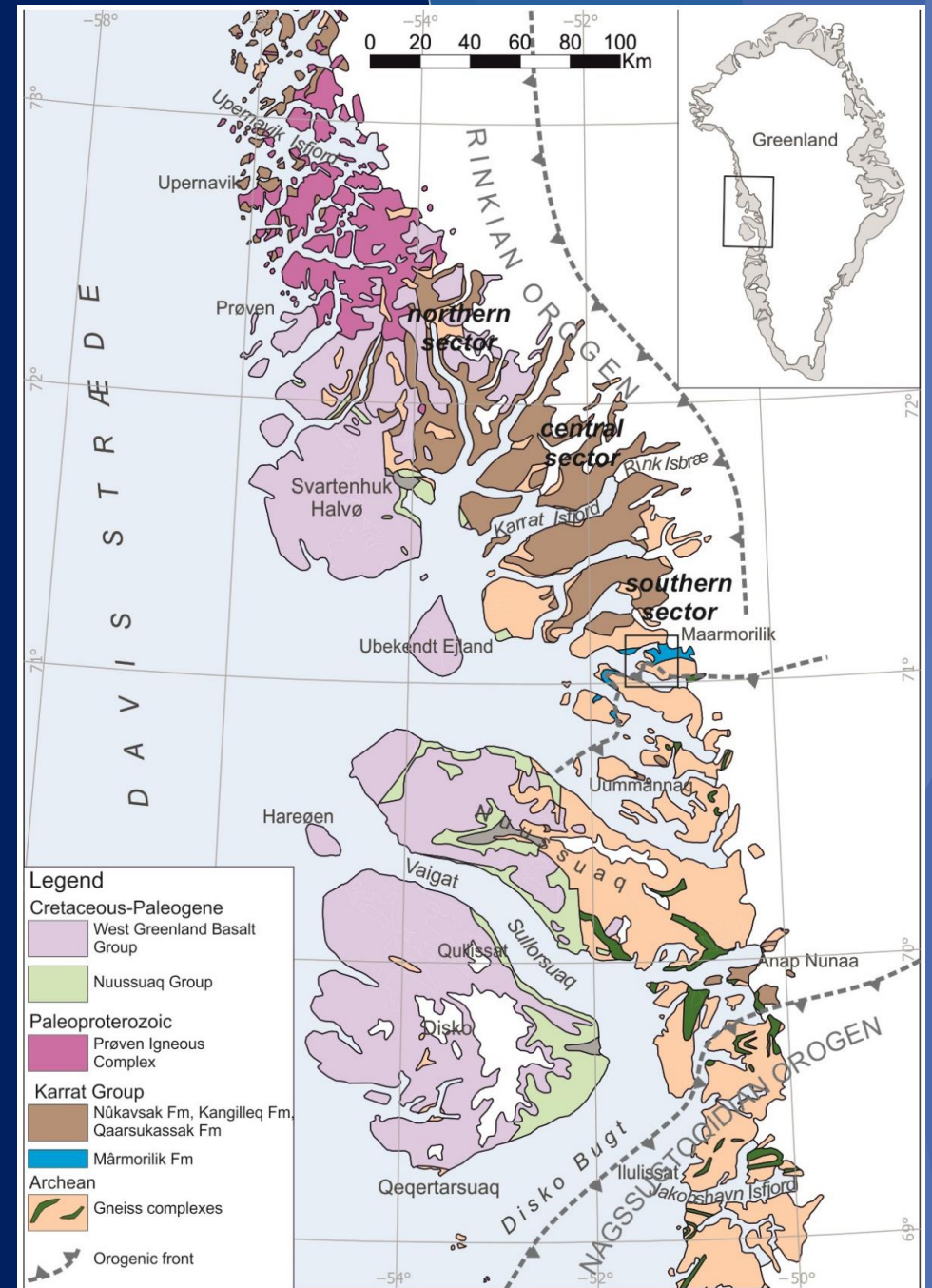


Figure from: Guarnieri et al., 2022, Minerals

- The lower units (Qaarsukassak and Mârmorilik fms.) of the Karrat Group formed in an intracratonic sag basin as the Rae Craton subsided. The basin progressively evolved through an intracratonic rift stage, with associated volcanism (Kangilleq fm., alkaline member) and syn-rift siliciclastic sedimentation (Nûkavsak fm.) between 1950 and 1900 Ma, to a later stage back-arc geodynamic setting (Kangilleq fm., transitional member).
- Between 1870 - 1850 Ma, the Karrat basin was intruded by calc-alkaline felsic intrusions of the Prøven Igneous Complex ('PIC').
- The Karrat Group was affected by metamorphism during the collisional phase of the Rinkian Orogen (Cordilleran-type tectonics) between 1830 and 1800 Ma, reaching upper greenschist facies in the south (at Black Angel and Kangerluarsuk), to granulite facies in the north, where the metamorphism is associated with migmatization and emplacement of the S-type leucogranites.
- The Rinkian orogen is interpreted as part of the Trans-Hudson Orogeny ([St-Onge et al., 2009](#)) and represents a back-arc fold and thrust system, resulting from the eastward collision between the magmatic arc PIC and the Karrat basin.
- The inversion of the Karrat Basin involved a first stage of thin-skinned tectonics, with allochthonous metagreywackes emplaced during east-verging thrusting, followed by thick-skinned tectonics (inversion) with progressive involvement of the Archaean gneisses with basement nappes and metasediments transported toward the north-east (e.g., [Guarnieri and Baker, 2022](#); [Grocott and McCaffrey, 2017](#)).

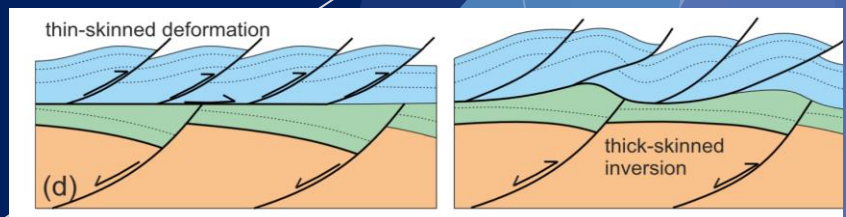
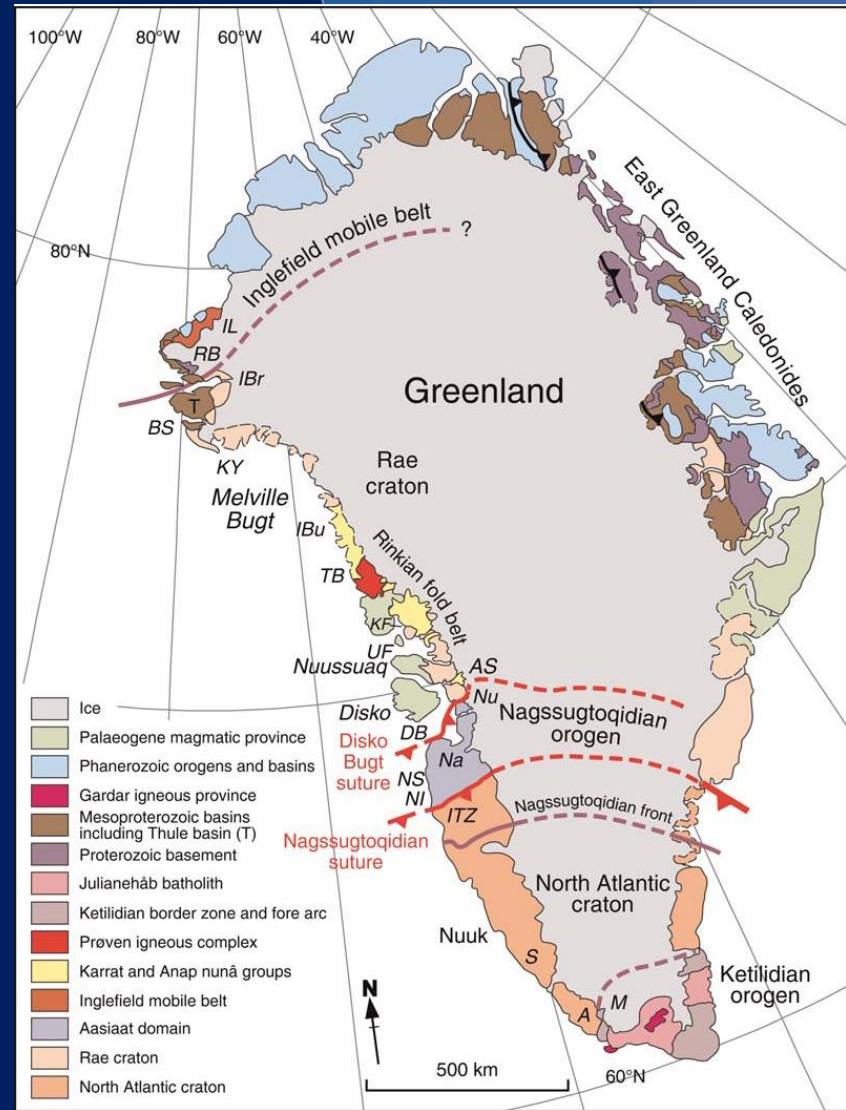
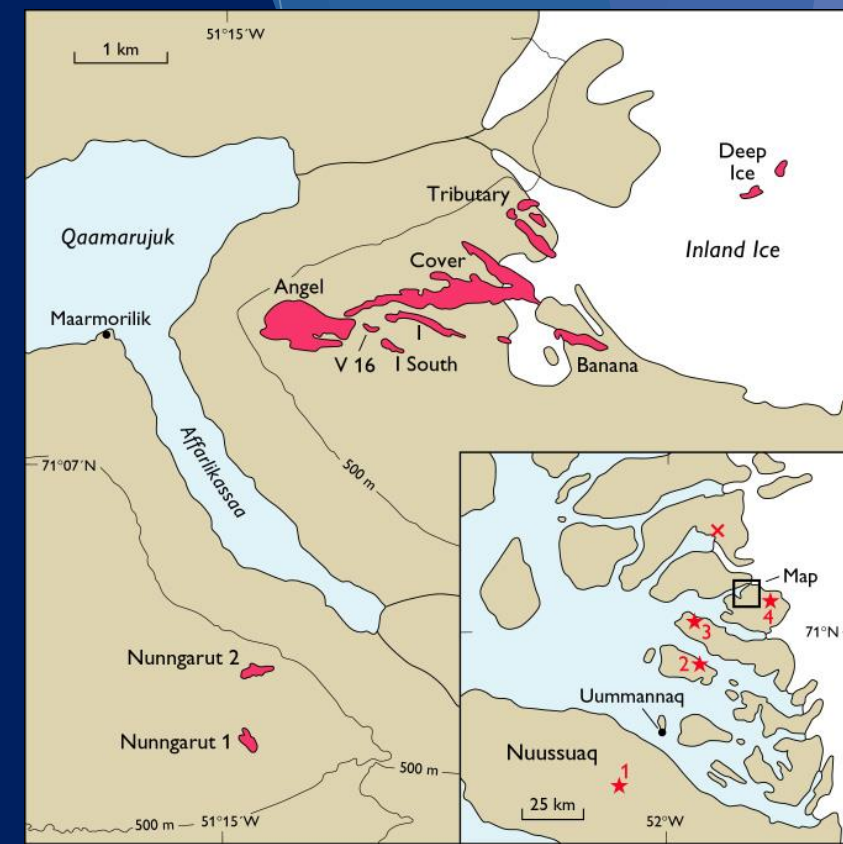


Figure from: Guarnieri and Baker, 2022, J. Structural Geol.

Figure from: St-Onge et al., 2009, Geol. Soc. London Spec. Pub.

# Located In A Proven Zn-Pb-Ag Mining District

- Bluejay's Kangerluarsuk Zn-Pb-Ag project located only 12 km north of the former Black Angel mine.
- At Black Angel, Zn-Pb-Ag mineralisation is hosted within the Paleoproterozoic Marmorilik fm. of the Karrat Group (calcitic and dolomitic marbles with a basal quartzitic unit and intercalations of anhydrite-bearing marbles and semipelitic schists, deposited in a carbonate shelf on the margins of an intracratonic sag basin) which were deposited ca. 1.9 Ga.
- The Marmorilik fm. represents a shallow-water, stromatolite-bearing marine carbonate platform.
- The mine was operated by Cominco (now Teck) between 1973–1986 and later Boliden from 1986–1990.
- The Black Angel deposit comprised of eight different orebodies and two satellite orebodies (the Nunngarut orebodies) with pre-mining reserves totalling 13.6 MT @12.3% Zn, 4.0% Pb and 29 g/t Ag. The mine produced 11.2 MT @ 12.6 % Zn, 4.1 % Pb and 29 g/t Ag during the 17-year mine life ([Thomassen, 2003](#)). Approximately 2.4 MT of ore remains in unmined pillars and other areas that were considered inaccessible to mining. Continued exploration following mine closure has identified several new satellite orebodies within the Marmorilik Fm. (e.g. South Lakes and ARK).
- Widely acknowledged as the most profitable mine in Greenland to date.
- Within the Black Angel district there are numerous (>200) mineralised showings with mineralisation occurring in different stratigraphic positions.



# Black Angel Mine: Geology

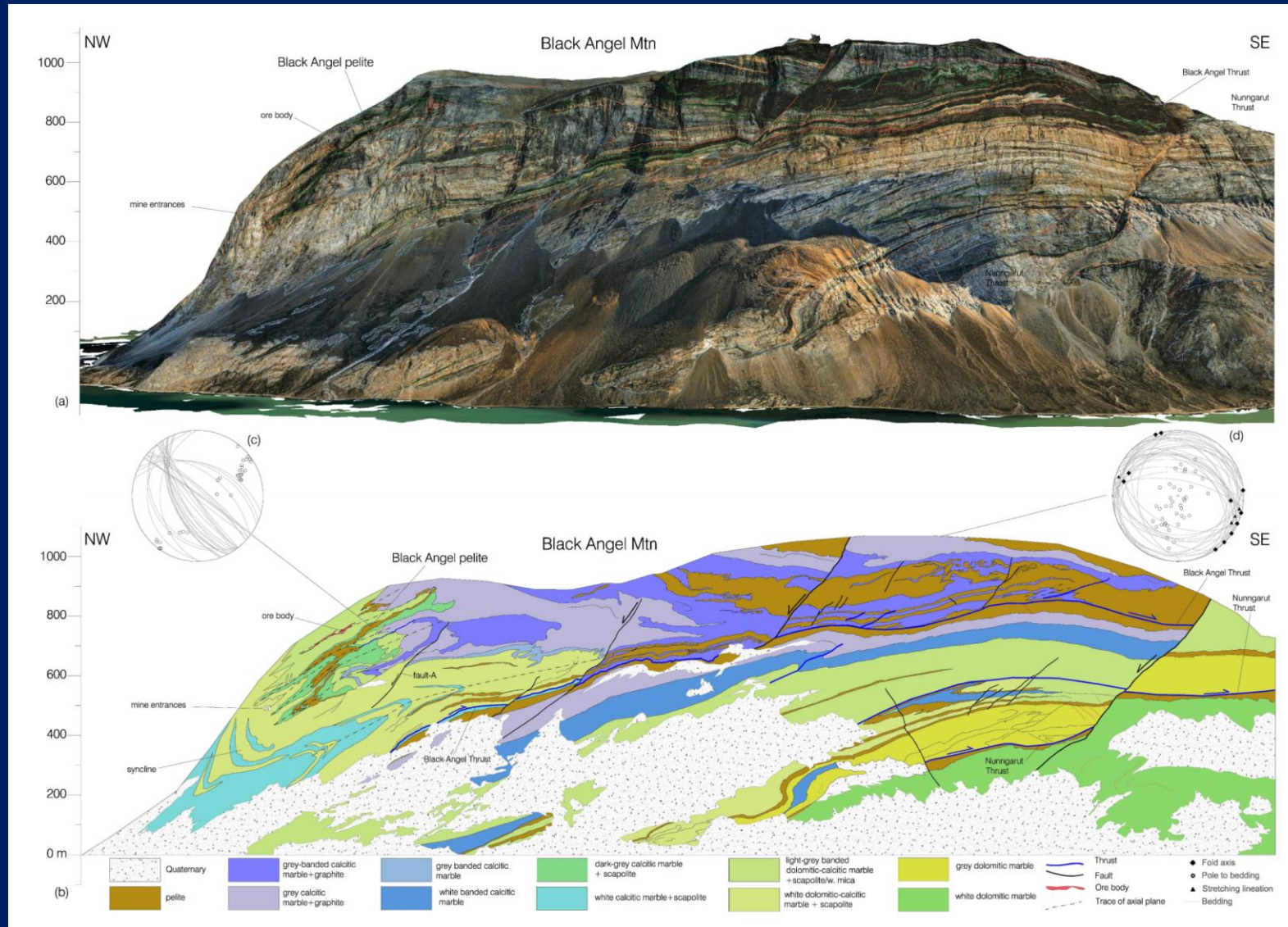


Figure from: Guarnieri et al., 2022, Minerals

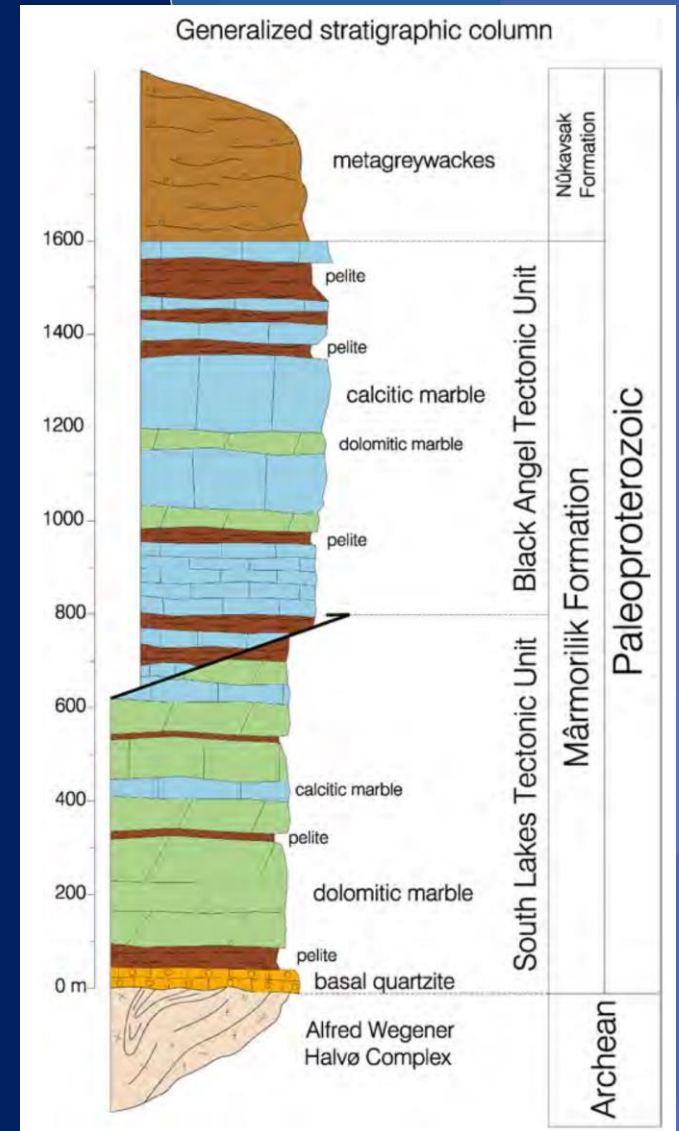
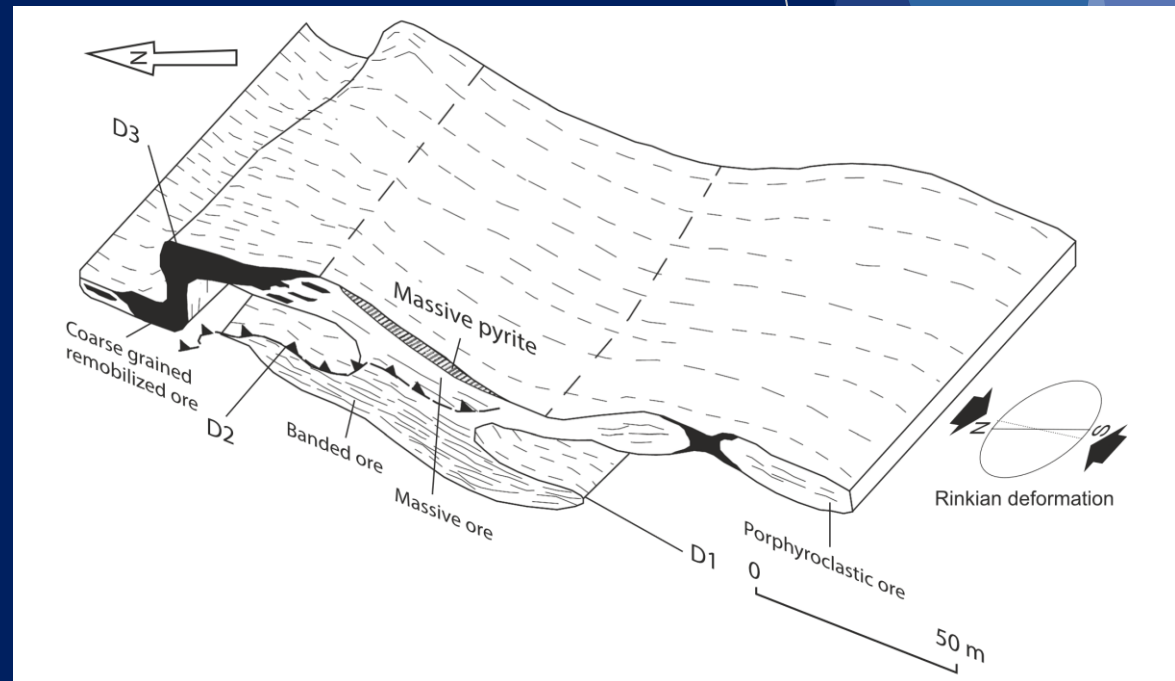
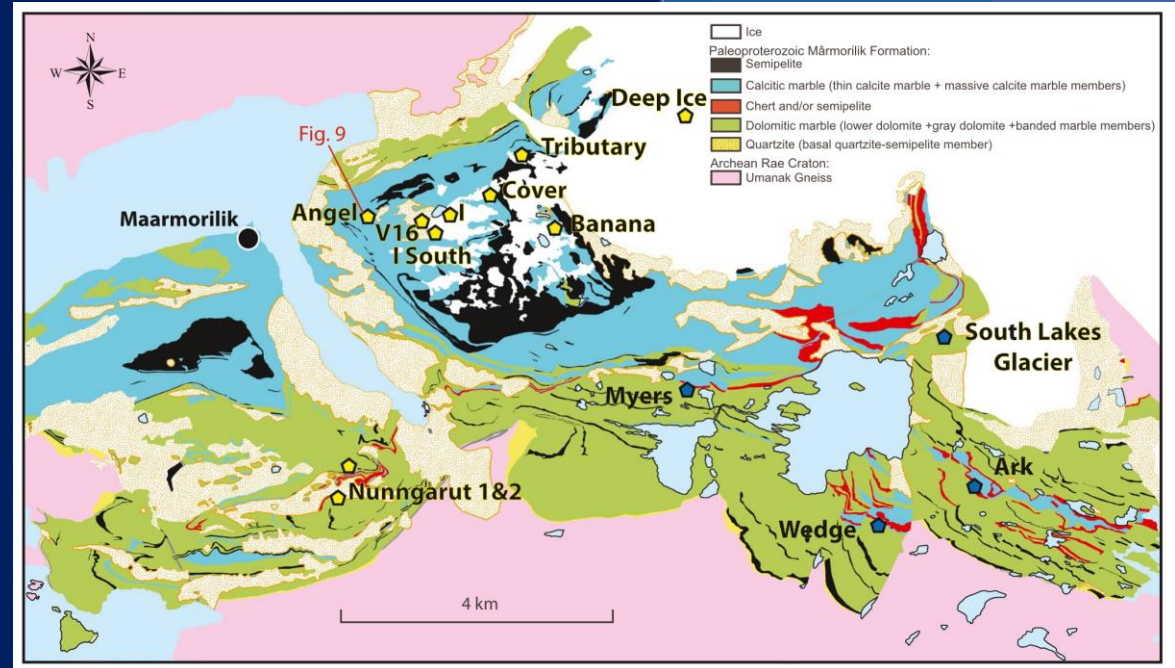


Figure from: Guarnieri and Baker, 2022, J. Structural Geol.



# Black Angel Mine: Mineralisation

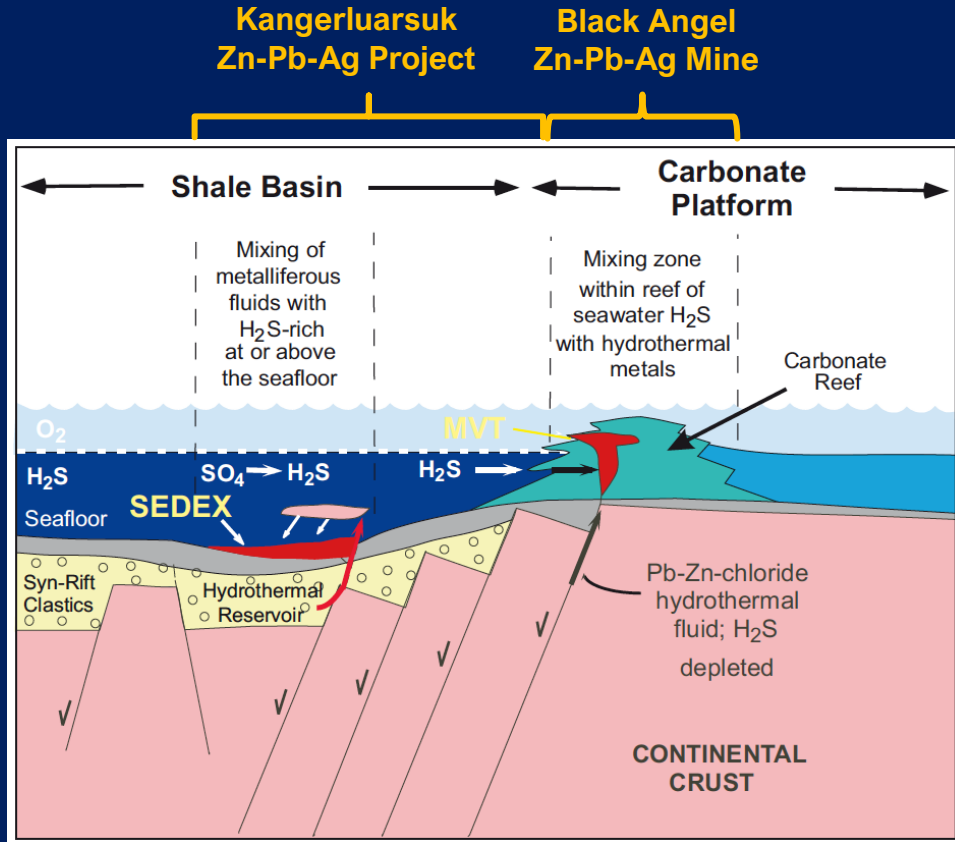
- The stratabound orebodies at Black Angel are hosted in anhydrite-bearing marble and consist of massive to semi-massive sphalerite-galena-pyrite, with minor to trace amounts of chalcopyrite, arsenopyrite, tetrahedrite, freibergite, tennantite, stannite, briartite, enargite, loellingite, polybasite, magnetite, rutile, and graphite.
- Despite a long exploration and mining history, the genetic model for the mineralisation remains debated (due to the effects of greenschist-facies metamorphism and intense multi-stage deformation that have affected and remobilised the ore).
- The deposit has been classified as an exhalative sediment-hosted massive sulphide (SEDEX) deposit (e.g., [Leach et al., 2005](#)); an epigenetic Mississippi Valley-type (MVT) deposit (e.g., [Partin et al., 2021](#); [Rosa et al., 2023](#)); and a metamorphic Kipushi-style deposit ([Horn et al., 2018](#)). An MVT model is the most favoured model in the current scientific literature for Black Angel.
- Recent mineralogical studies identified hitherto unrecognised germanium endowment within the Black Angel ore. Untested elsewhere in the Karrat Basin, although early mineralogical work on samples from Bluejay’s Kangerluarsuk project by Karlsruhe Institute of Technology, Germany, supports a potential for germanium associated with the Zn-Pb-Ag mineralisation.



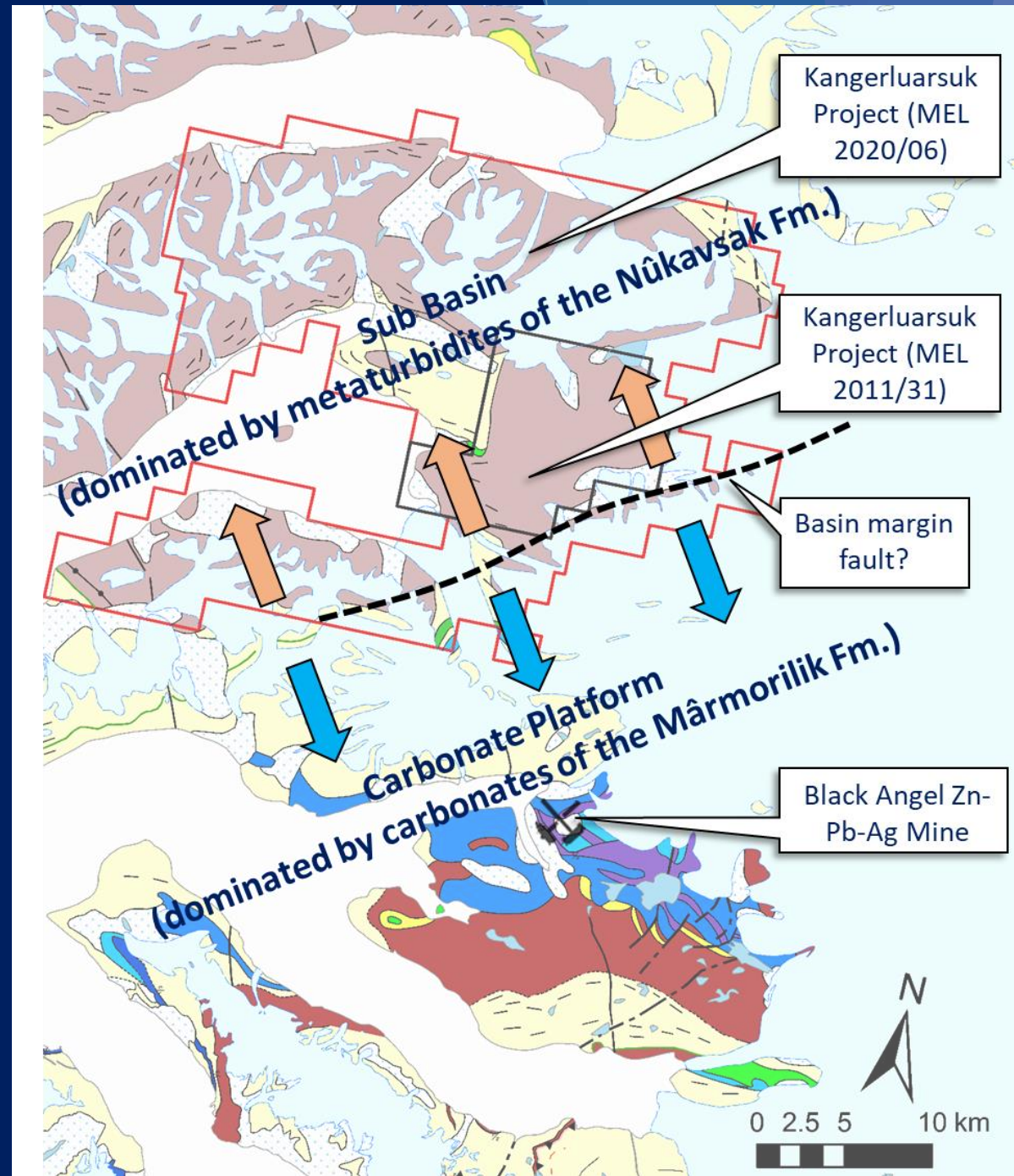
Figures from: Rosa et al., 2023, Mineralium Deposita

# Favourably located close to former Zn-Pb-Ag mine

The Kangerluarsuk Zn-Pb-Ag project is favourably situated within a sub-basin immediately north of the basin margin fault that separates the Karrat basin to the north and the carbonate platform (and former Black Angel Mine) to the south.



Model for the geological setting of cogenetic SEDEX and MVT deposit types in the Selwyn basin and the Mackenzie platform. Figure from: Goodfellow (2007).



# Kangerluarsuk (looking northwest)

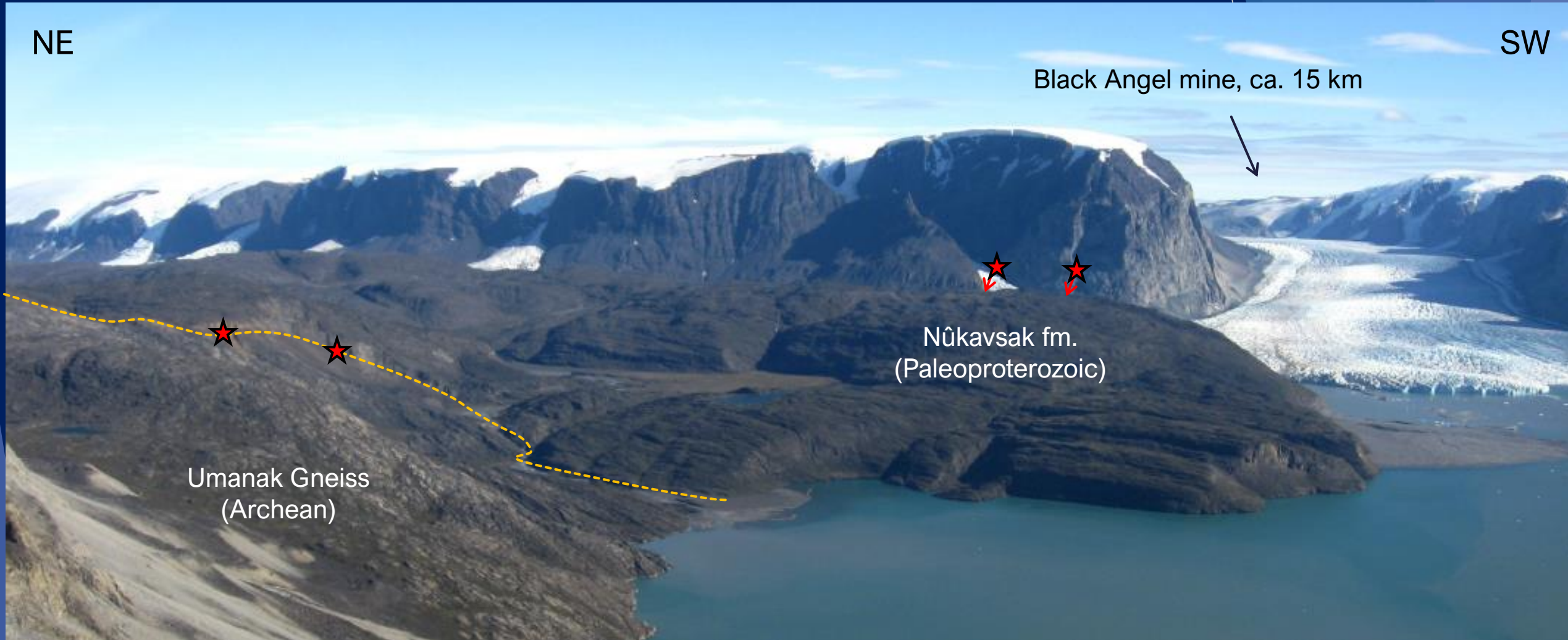




# Zn-Pb-Ag mineralisation at basin margins

NE

SW



Black Angel mine, ca. 15 km

Nûkavsak fm.  
(Paleoproterozoic)

Umanak Gneiss  
(Archean)

Outcropping high-grade Zn-Pb-Ag mineralisation (stars), close to the basement contact, identified over a > 9 km strike length. Note much of Bluejay's central Kangerluarsuk licence (MEL 2011/31) is located on a relatively flat plateau at the head of the Kangerluarsuk Fjord, at an elevation of ca. 500 – 770 metres (facilitating easy access for future drilling).

# Kangerluarsuk (looking southeast)

Nûkavsak fm.

Umanak Gneiss  
(Archean)

Kangerluarsuup  
Sermia

The “Kangerluarsuup Glacier Showings” (up to 9 % Zn, 11.8 % Pb and 539 g/t Ag) are exposed in the Qaarsukassak fm. in the lower ground of this valley.

Nûkavsak fm.  
(Paleoproterozoic)

# Kangerluarsuk (looking west)

Kangerluarsuk Fjord  
(deep water, ice free for most of the year)

Umanak Gneiss  
(Archean)

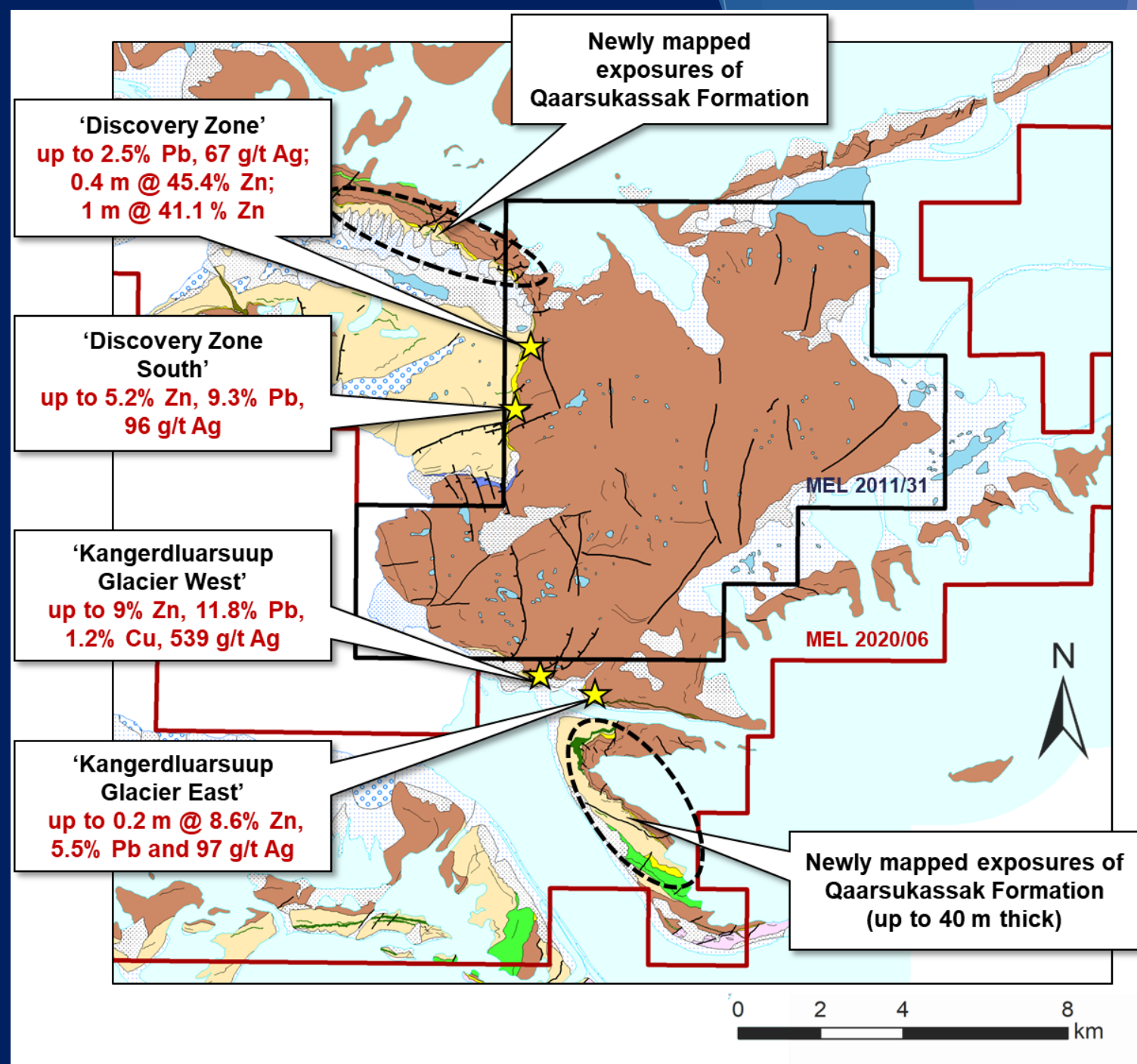
Nûkavsak fm.

Nûkavsak fm.  
(Paleoproterozoic)

Upernavik Amphibolite  
(Archean)

# Widespread outcropping ore-grade Zn-Pb-Ag ± Cu mineralisation at Kangerluarsuk

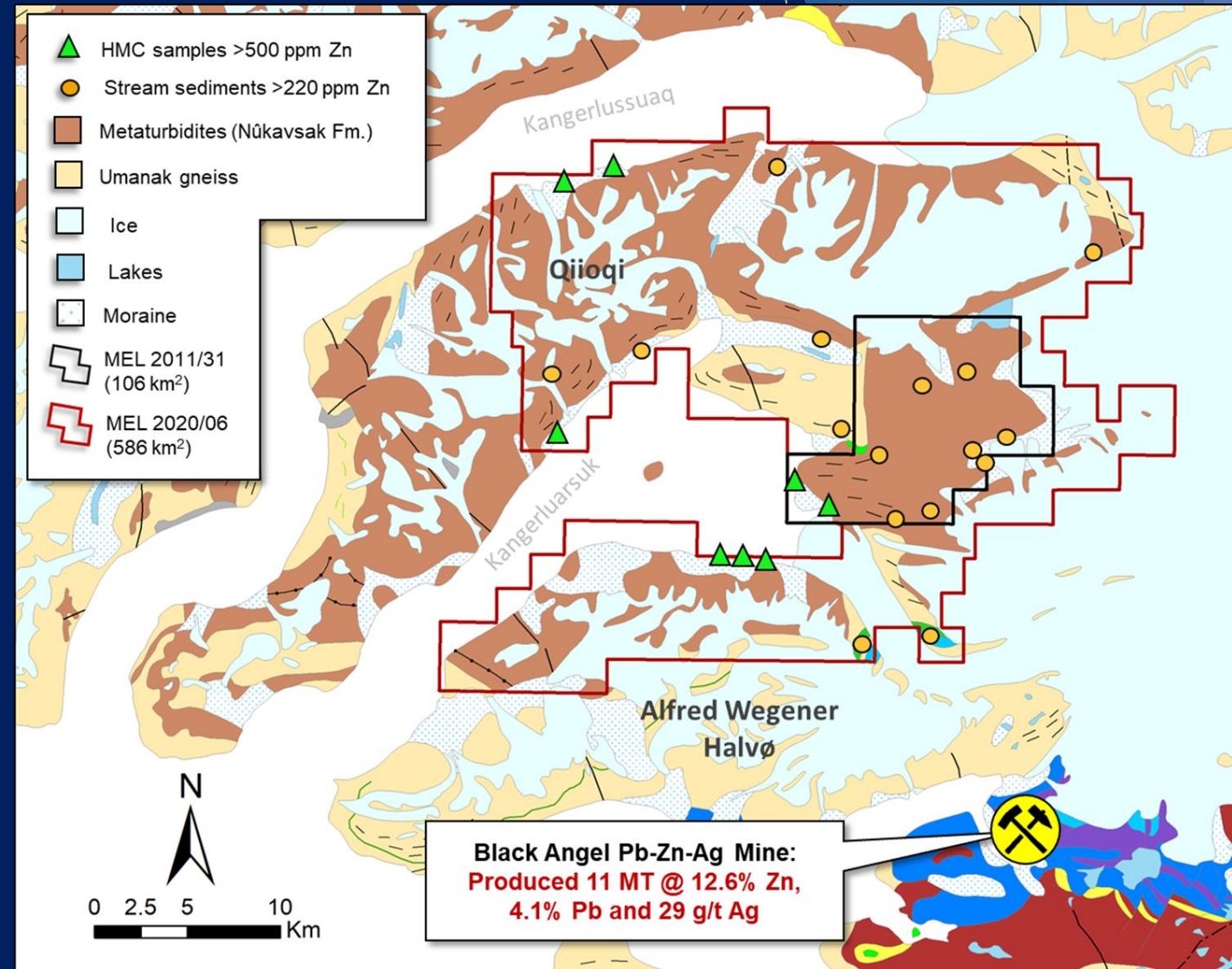
- Historic surface sampling by Rio Tinto Zinc (RTZ) underpins the resource potential.
- RTZ identified several zones of outcropping mineralisation with chip sampling results of up to up to 1 metre @ 41.1% Zn, 0.4 metres @ 45.4 % Zn and grab samples of up to 9.3% Pb, 1.2% Cu and 596 grammes per tonne ('g/t') Ag (Coppard et al. 1992).
- Newly discovered exposures of Qaarsukassak Formation (the host lithology to all known Zn-Pb-Ag mineralisation at Kangerluarsuk) within MEL 2020/06 further increases prospectivity of Bluejay's licence areas.



# Bluejay's licence areas MEL 2011/31 and 2020/06

[Click here](#) to see our RNS dated 27 January 2020

- Bluejay's Kangerluarsuk Zn-Pb-Ag project located only 12 km North of the former Black Angel Mine.
- Bluejay awarded an additional 586 sq km exploration licence at Kangerluarsuk (MEL 2020/06) in January 2020, surrounding the company's original licence (MEL 2011/31). The new licence ensures the security and integrity of the project ahead of the planned maiden drilling programme in 2023.
- New licence area selected based upon (1) Proximity to known mineralisation within Bluejay's existing licence; (2) stream sediment and heavy mineral concentrates ('HMC') that are highly anomalous in Zn, Pb, Cu and Ag suggesting the presence of poly-metallic mineralisation, supported by elevated pathfinder elements such as Cd, As and Cs; (3) the mapped distribution of the Nûkavsak fm. on the premise that all known mineralisation is located at the beneath this unit within the Qaarsukassak fm., close to the contact with basement; (4) the presence of mineralised outcrop/float samples identified by earlier explorers in the early 1990's



## 1979 - 80

**Cominco Ltd (now Teck) and Greenex A/S** carried out regional exploration for Zn-Pb, Cu, Au and diamonds. Mapped extensive massive iron-sulphide horizons within the Nûkavsak fm. of the Karrat Group. First findings of Zn-Pb ± Cu mineralised boulders at the head of the Kangerluarsuk Fjord (within Bluejay's current licence area).

## 1989 - 90, 92, 97

**Geological Survey of Greenland (GGU)** carried out regional geochemical reconnaissance, including stream sediment and HMC sampling throughout the Karrat Group. Stream sediment samples yielded up to 2200 ppm zinc within Bluejay's licence areas (strongest zinc anomalies in Greenland).

## 1991 - 92

Joint Venture between **Rio Tinto Zinc ('RTZ Mining and Exploration Ltd.')** and **Platinova** discovered several zones of high-grade outcropping mineralisation at Kangerluarsuk up to 41% Zn, 9.3% Pb, 1.2% Cu and 596 g/t Ag and channel samples assaying 45.4% Zn and 41.1% Zn over 0.4 and 1 metres respectively, within Bluejay's current licence area.

## 1997

**Platinova** commissioned a 435 line-km helicopter-borne DIGHEM<sup>®</sup> electromagnetic and magnetic survey over Bluejay's current licence area.



Cominco's 1979 mapping of outcropping sulphide formations within the Nûkavsak fm. and the discovery of mineralised boulders



Finely laminated Zn-Pb mineralisation from the Kangerluarsup Glacier Showings, Kangerluarsuk

**2011**

**Avannaa Resources** acquired the Kangerluarsuk Project (exploration licence 2011/31).

**2011 - 2013**

Between 2011-2013 Avannaa had carried out an aggressive campaign to advance the project, including: detailed geological and structural mapping; MMI (Mobile Metal Ion) and 2-acid digest bulk soil geochemistry; SGH (Soil Gas Hydrocarbon) analysis; a 348 line-km helicopter-borne magnetics and ZTEM (Z-Axis Tipper electromagnetics) survey; a pilot high-resolution reflection seismic survey.

**2015 - 2017**

Joint mapping project between the **Geological Survey of Denmark and Greenland (GEUS)** and the **Government of Greenland's Ministry of Mineral Resources** of the Karrat Group. Much-improved understanding of the stratigraphy and structural evolution of the meta-sedimentary and meta-volcanic rocks of the Karrat Group that host Kangerluarsuk project. New geochronological, geochemical, structural, petrological, 3D-photogeological data collected. New 1:100,000 scale map sheets produced (2022). Several academic papers and research thesis published on the Karrat Group, including studies on the mineralisation within Bluejay's licence area.

**2017**

**EIT RawMaterials EU-funded UpDeep Project** carried out an MMI and biogeochemical sampling programme at Kangerluarsuk.



2012 helicopter-borne ZTEM survey at Kangerluarsuk

**2017**

**Bluejay Mining** acquired the Kangerluarsuk project (mineral exploration licence 2011/31), when the Company purchased Avannaa Resources and its exploration assets, in an all-share transaction from Cairn Energy Plc.

**2020**

Bluejay increased its Kangerluarsuk licence area five-fold (awarded new mineral exploration licence MEL 2020/06) owing to the potential the company recognise within the Karrat Group for large scale base metal deposits. Licences now total 692 sq-km.

In partnership with **Camborne School of Mines** (University of Exeter), Bluejay completed a detailed prospectivity analysis, integrating both multivariate principal component analysis (PCA) of selective leach geochemistry datasets and airborne geophysics to assist with drill target delineation and ranking.

**2022**

Bluejay commissioned a FALCON® Airborne Gravity Gradiometer ('AGG'), magnetic and LIDAR survey over Kangerluarsuk to further refine drill targets.

**2023**

Maiden drill programme at Kangerluarsuk planned for July-August 2023, alongside an aggressive regional field programme (reconnaissance, geological mapping, channel sampling, stream sediment and HMC sampling).



Bluejay geologists carrying out fieldwork at Kangerluarsuk in 2019

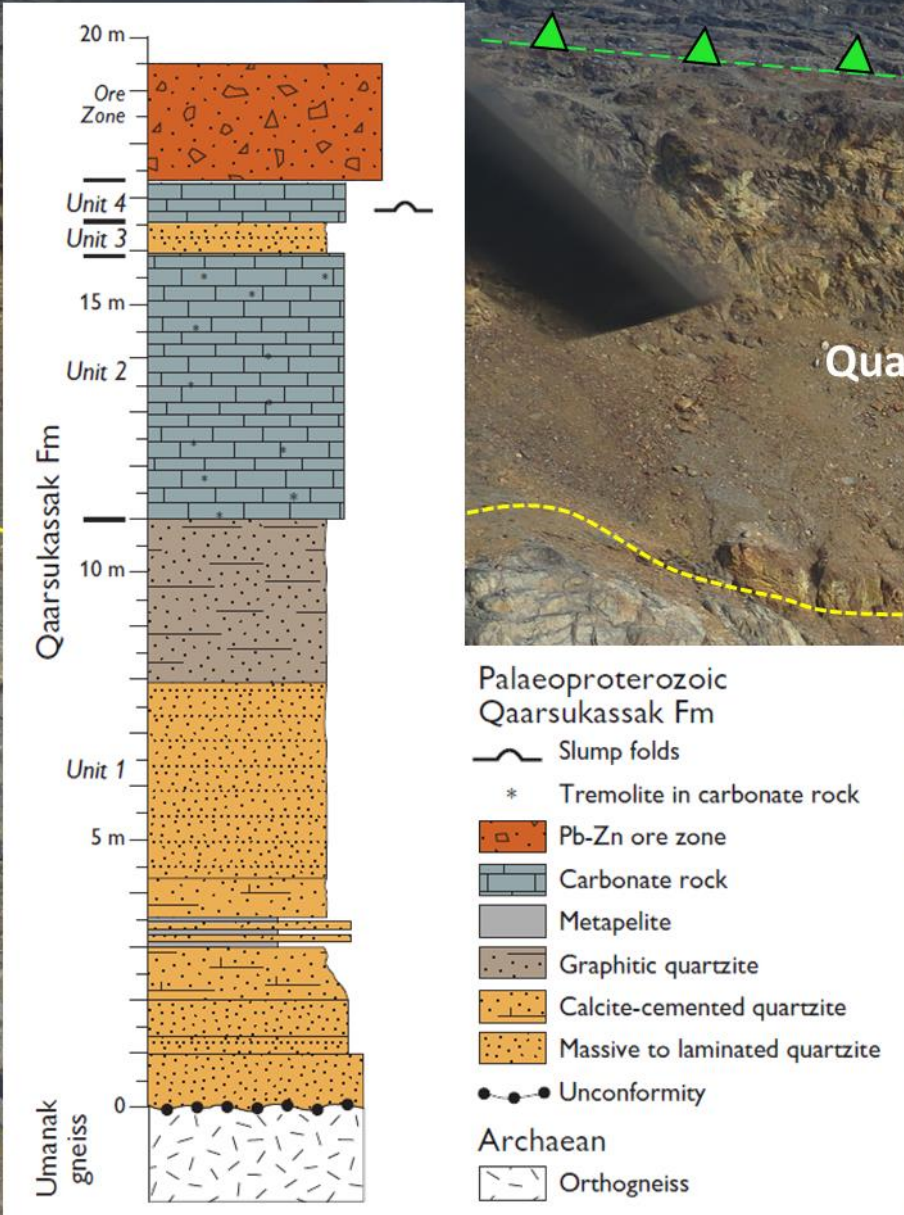


Bluejay CEO Dr Bo Stensgaard prospecting at Kangerluarsuk in 2019





Stratigraphic section from: Guarneri et al., 2018, GEUS Bulletin



Metaturbidites of the Nûkavsak fm.

Thrust Contact?

Quartzite-marble package of the Qaarsukassak fm.  
(hosts Zn-Pb-Ag ± Cu mineralisation)

Erosional  
unconformity

Basement gneisses

Palaeoproterozoic

Archaean

# The Qaarsukassak Formation in detail

- The Qaarsukassak fm. was originally interpreted to represent a structurally displaced basal component of the Marmorilik fm. (that hosts Black Angel mine). Recognised as a separate formation by [Guarnieri et al., 2016](#).
- The Marmorilik and Qaarsukassak formations were both deposited directly on Archaean crystalline basement rocks and likely have similar depositional timing; however, they are separated by a basement topographic high (on Alfred Wegener Halvø) and are not observed in stratigraphic contact.
- Qaarsukassak fm. (ca. 2.0 Ga) at the “Discovery Zone” ranges from 30 to 66 m thickness. The lower contact with the Archean Umanak gneiss (ca. 2.9 – 3.0 Ga) is a planar to undulating erosional surface that preserves a depositional contact. Laminated to massive quartzite fines upward into fine-grained metamorphosed sandstones and sandy mudstones, including calcite-cemented and graphitic quartzites (“Unit 1”). Asymmetrical ripple marks in the basal metasandstone suggest a fluvial to marginal marine setting.
- These siliciclastic rocks are overlain in sharp contact by light grey to white calcitic metacarbonate rocks with pods of massive tremolite and in some horizons, minor graphite (“Unit 2”).
- This is succeeded by another quartzite unit (“Unit 3”), followed by dark grey, laminated calcitic metacarbonate rocks with possible slump folds and minor tremolite veining (“Unit 4”).
- The overlying, rusty weathering metasedimentary rocks including graphitic, metamorphosed mudstones and siliciclastic rocks (“Unit 5”) that represent the ore zone (e.g., [Guarnieri et al., 2016](#); [Partin et al. 2021](#)).
- The upper contact with the Nûkavsak fm. is not well exposed. Suggested that it locally preserves a sedimentary contact ([Partin et al., 2021](#)), though in many places the contact is now a structural (thrust contact) and the Nûkavsak fm. considered to be allochthonous. Also of note is a thin re-sedimented calcitic marble horizon within the basal part of the Nûkavsak fm., which might be derived from contemporaneous erosion of the Qaarsukassak fm.
- Variable thickness of the formation along strike suggests that deposition of the Qaarsukassak fm. was infilling post-unconformity basement paleo-topography ([Guarnieri et al., 2016](#)). Later thickening through structural repetition caused by thrusting is also recognised.

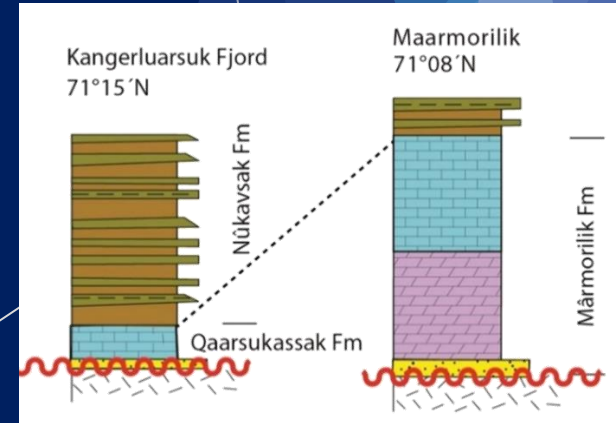
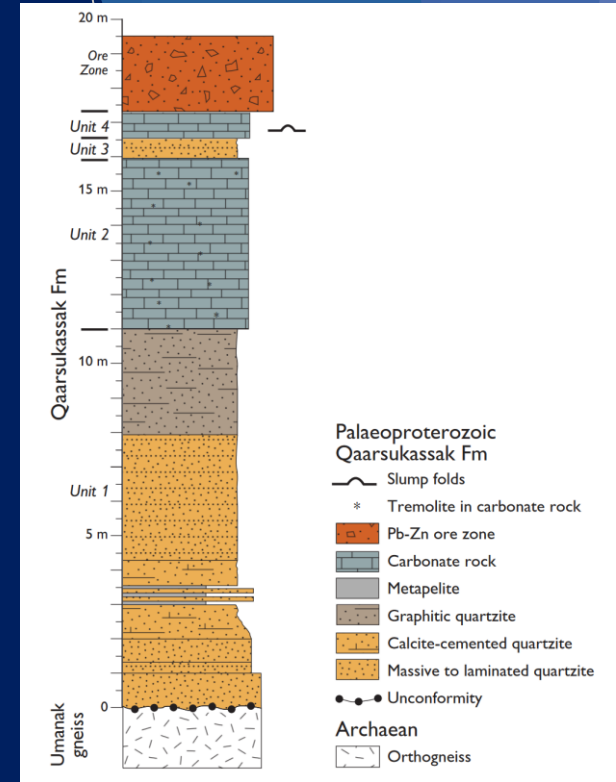


Figure from: [Guarnieri et al., 2016](#), *GEUS Bulletin*

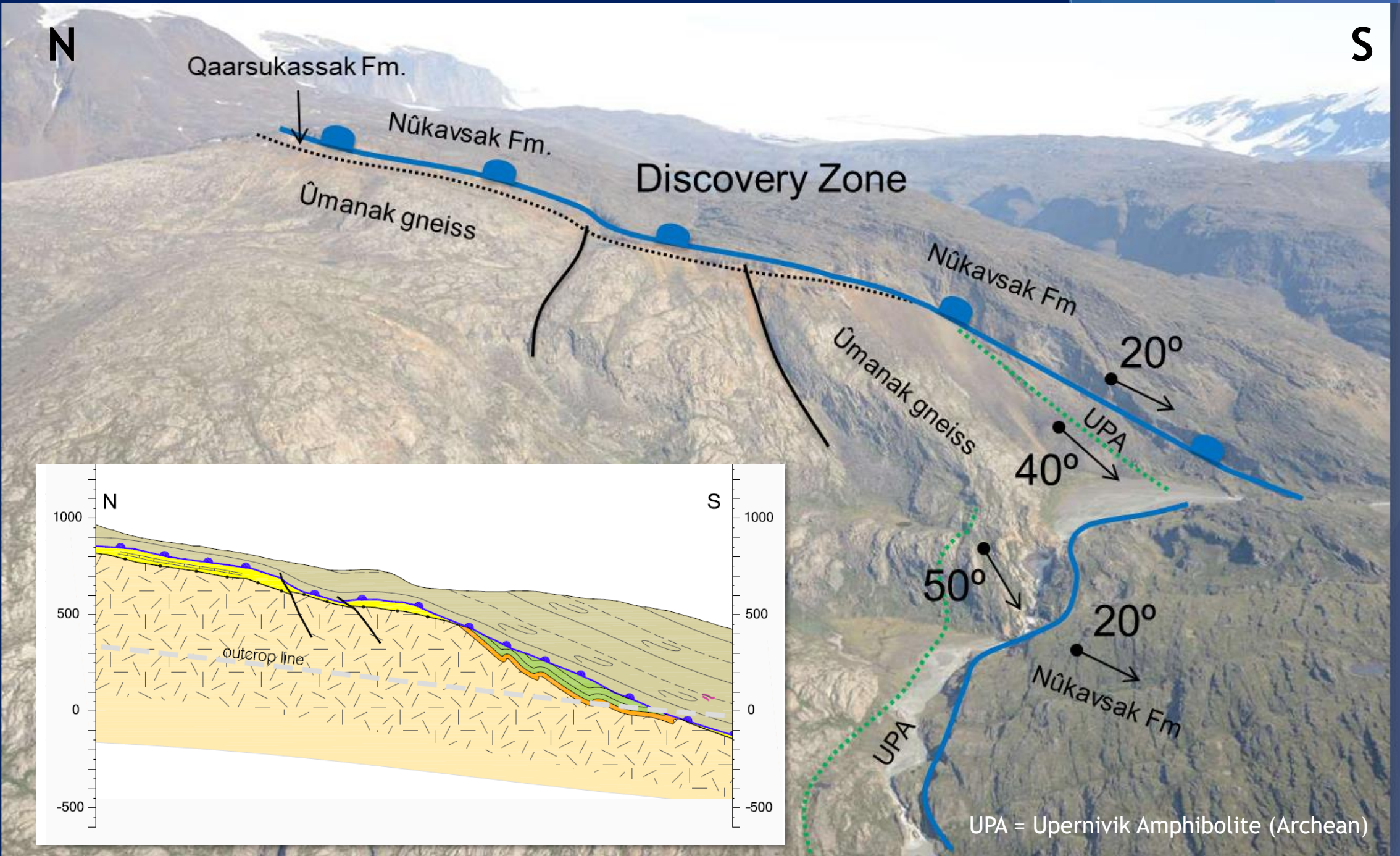
# Mineralisation at the Discovery Zone

- Known mineralisation generally occurs within 10's of metres of the unconformable erosional contact with the Archaean basement (Umanak gneiss).
- The metamorphosed/recrystallised Zn-Pb-Ag mineralisation at the Discovery Zone occurs intermittently at surface over a strike length of 9 km, is stratabound and contains massive, medium- to coarse-grained **pyrite, pyrrhotite, "blackjack" sphalerite, galena and sulfosalts** hosted by ferruginous horizons within the dominantly siliciclastic, uppermost unit ("Unit 5") of the Qaarsukassak fm.
- Finely banded texture of the Zn-Pb mineralisation from the Kangerluarsup Glacier Showings (KGS; approx. 9 km south of the discovery zone) are almost certainly due to deformation rather than primary textures.
- Discovery Zone and KGS showings considered the distal expressions of a large buried base metal deposit(s).
- An exhalative sediment-hosted massive sulphide (SEDEX) model has been suggested as the most likely deposit model for Kangerluarsuk (e.g., [Partin et al., 2021](#)), which has been structurally modified and metamorphosed. However based on the correlation with the Marmorilik fm. (including the presence of calcitic metacarbonates in the Qaarsukassak fm.) and some characteristics atypical of SEDEX deposits, an MVT model has also been proposed (e.g., Dr. Diogo Rosa, Pers. Comm.).
- Earlier operators, Rio Tinto Zinc and Avannaq Resources highlighted similarities with the Sullivan deposit (162mt @ 5.9% Zn and 6.1% Pb) in the Yukon and the Rammelsberg deposit (25mt @ 18.1% Zn, 8.6% Pb and 1.1% Cu) in Germany.
- Recent regional mapping by GEUS demonstrates the potential for Qaarsukassak fm. hosted Zn-Pb mineralisation throughout the Karrat Basin.



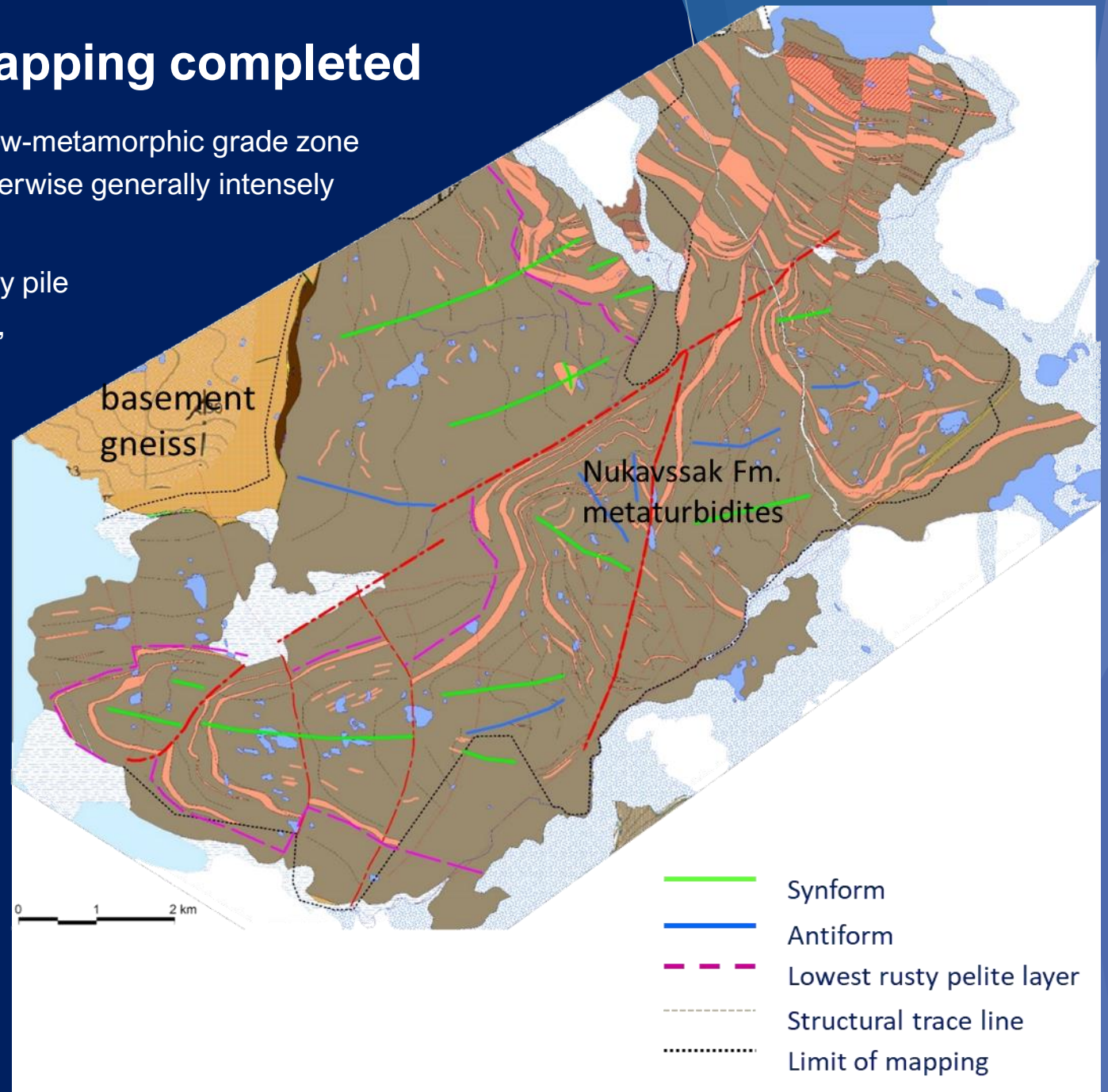
Gossanous 'Discovery Zone' at Kangerluarsuk

# The "Discovery Zone"

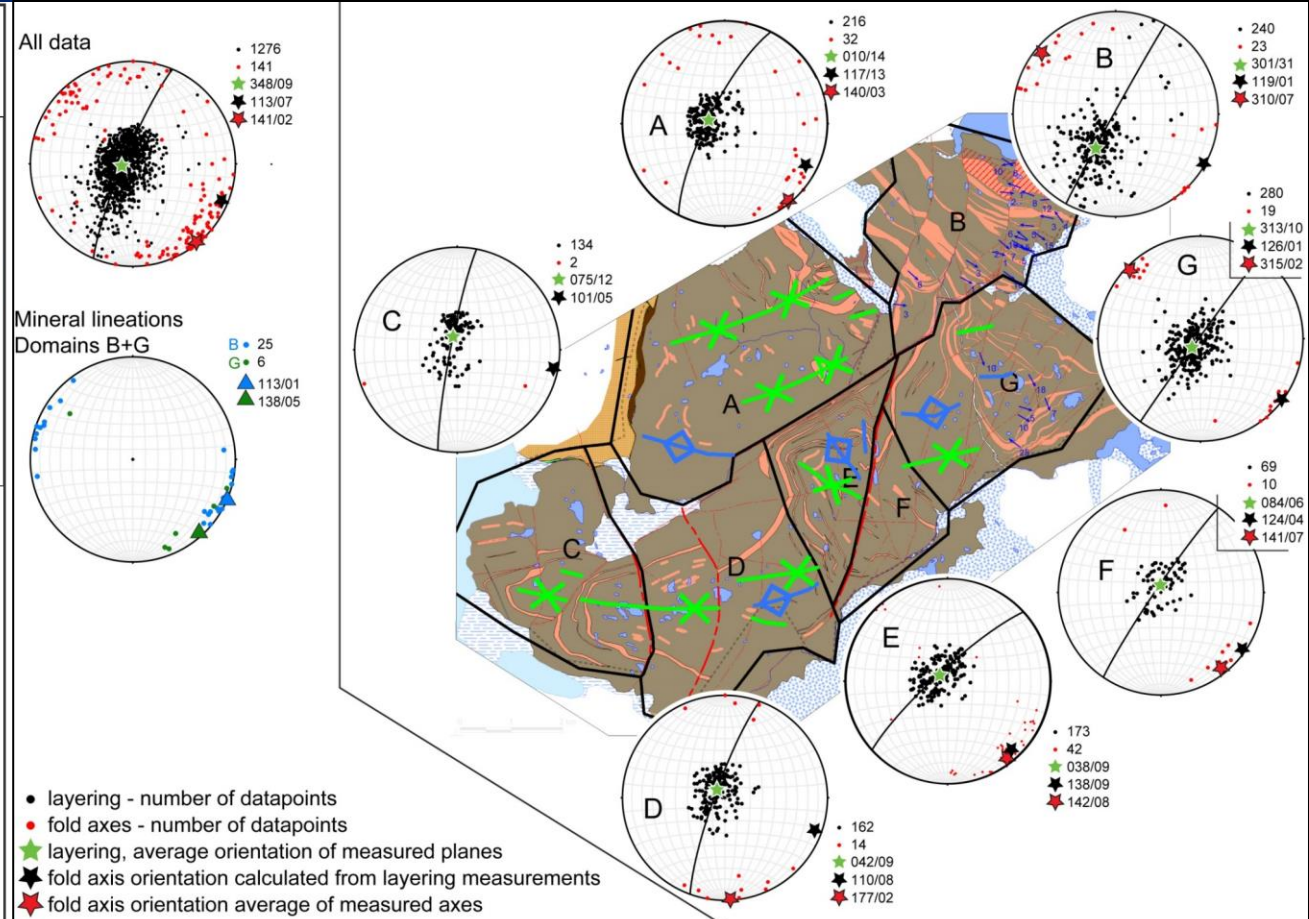
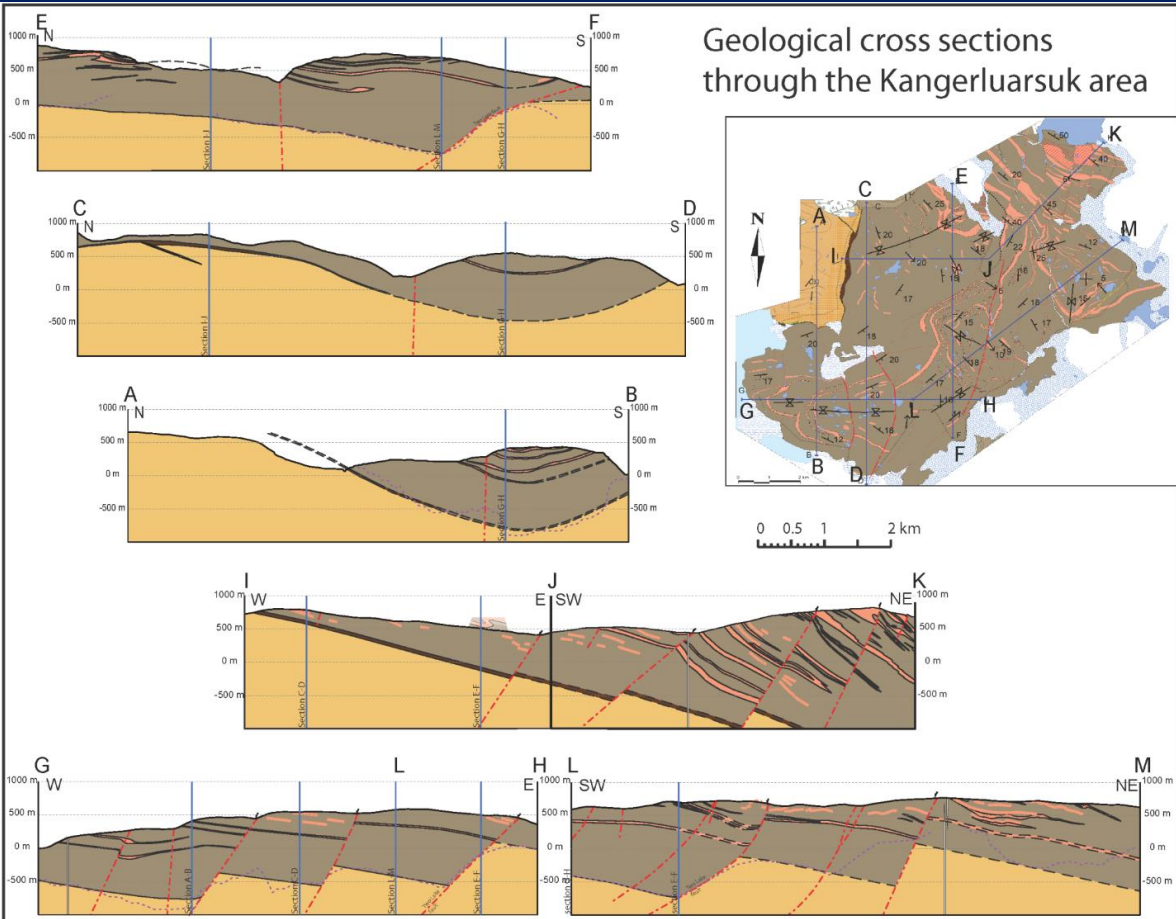


# Detailed geological & structural mapping completed

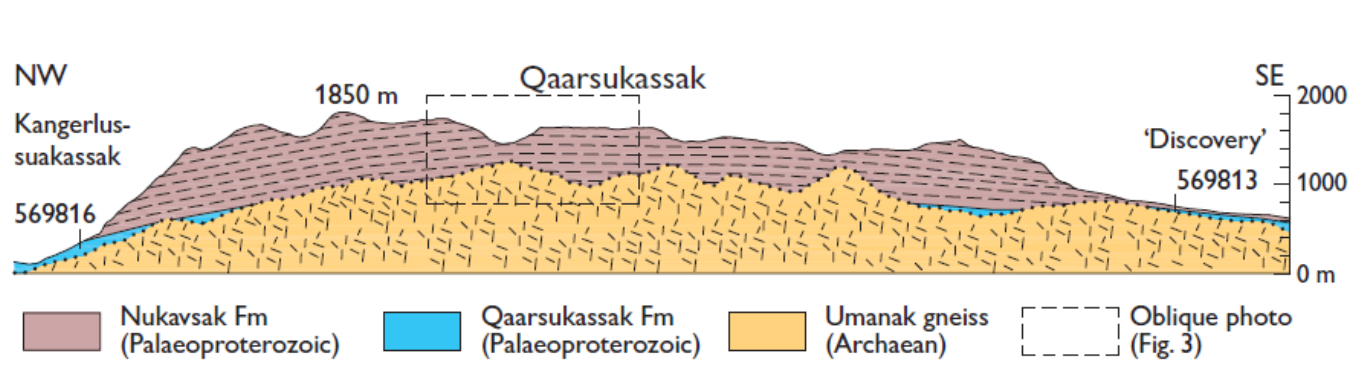
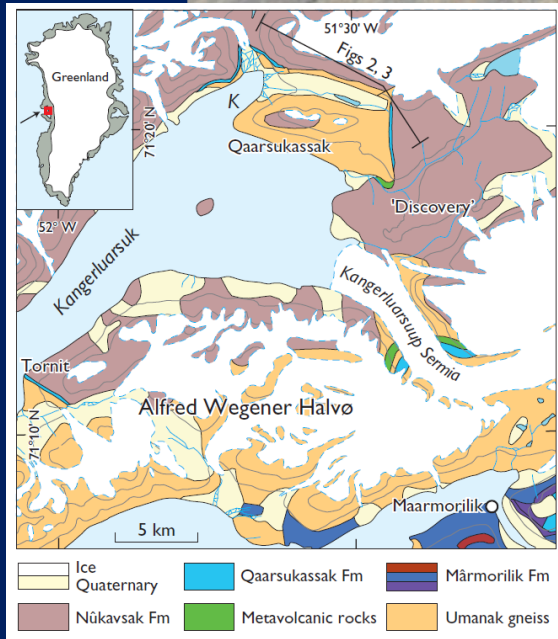
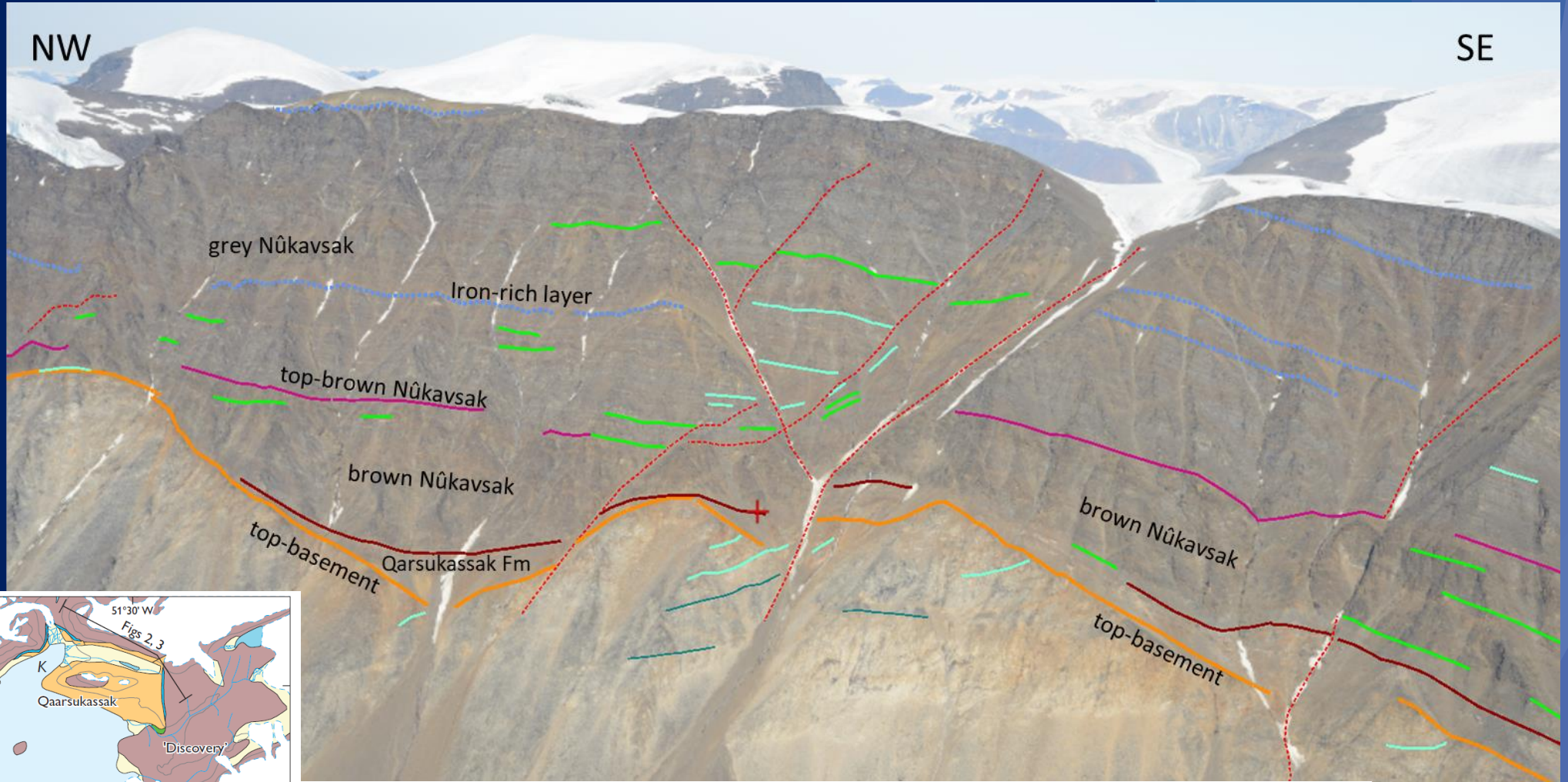
- Bluejay's licence area is recognised as a lower-strain and low-metamorphic grade zone (greenschist facies) within the Rinkian Orogen, which is otherwise generally intensely folded and thrust.
- The (allochthonous) Nûkavsak fm. forms a thick sedimentary pile overlying the Zn-Pb-Ag ± Cu mineralised Qaarsukassak fm., indicating a potential for a buried deposit(s) beneath the Nûkavsak fm. throughout Bluejay's licence area.
- Claystones (mapped in pink) and rusty pelite layers provide marker horizons within the metaturbidites (metasiltstones, metamudstones and fine-grained metagreywacke sandstones) of the Nûkavsak fm.
- Relatively simple deformation style, could imply large deposit footprint(s)?
- Subsequent mapping by GEUS defines the Qaarsukassak fm. (that hosts the Discovery Zone and KGS mineralisation) as a separate formation below the Nûkavsak fm., with a thrust contact between the two and the Nûkavsak fm. considered to be allochthonous.



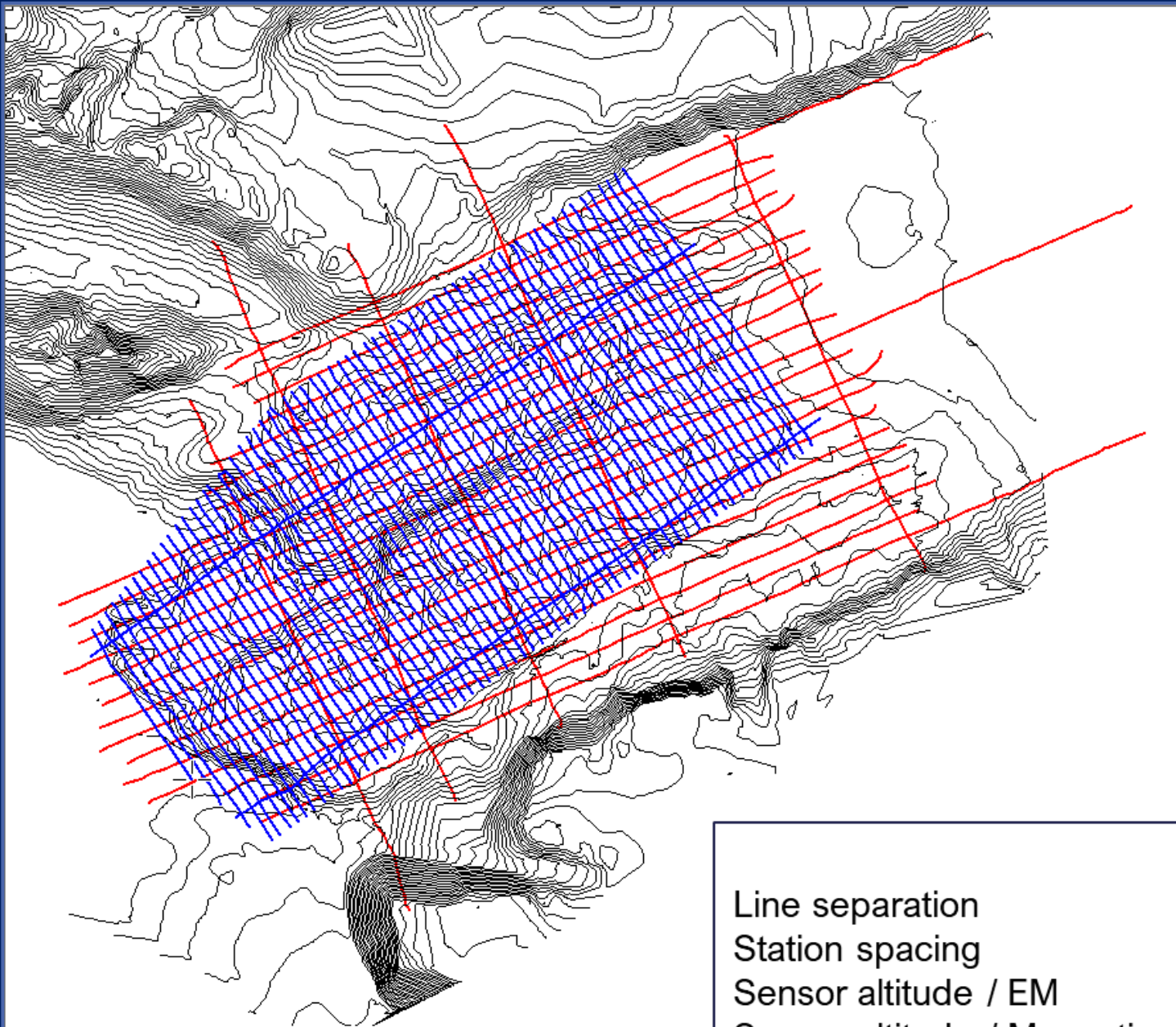
# Detailed geological & structural mapping completed



# Example of Qaarsukassak fm. deposited on paleo-topography







- **Bluelines:** 1997 DIGHEM<sup>V</sup> survey commissioned by Platinova, totalling 435 line-km.
- **Redlines:** 2013 ZTEM survey commissioned by Avannaq Resources, totalling 348 line-km.
- Extensive inversion modelling of the ZTEM data by Mira Geoscience.
- 3D inversion of the EM data has identified multiple deep, highly conductive bodies close to the modelled basement contact.

Line separation  
 Station spacing  
 Sensor altitude / EM  
 Sensor altitude / Magnetics

**Dighem<sup>V</sup>**

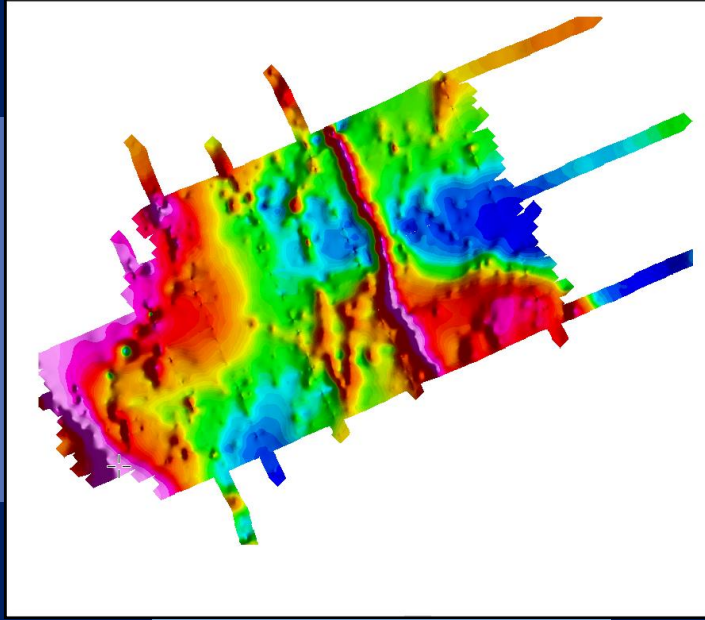
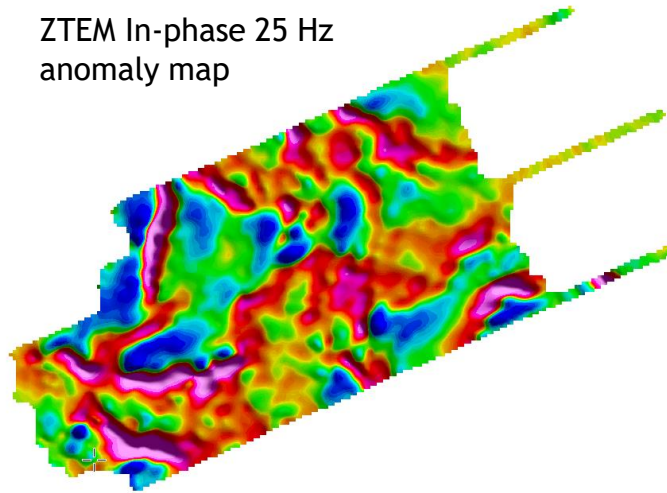
200 m  
 3 m  
 30 m  
 30 m

**ZTEM**

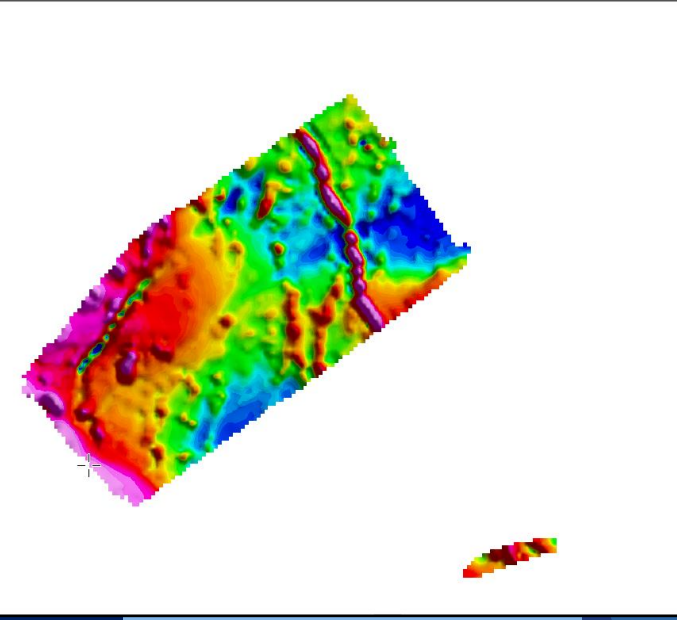
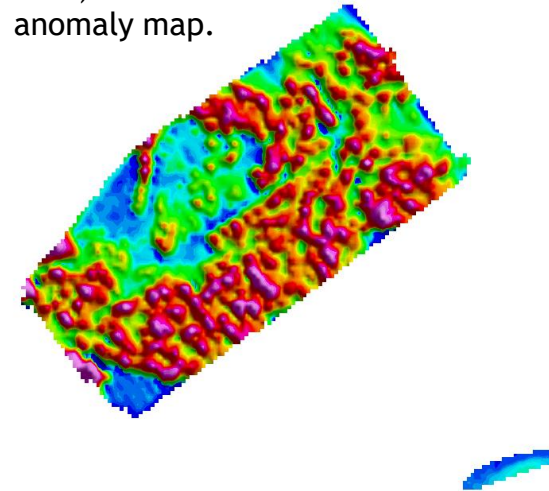
400 m  
 9.5 m  
 108 m  
 123 m

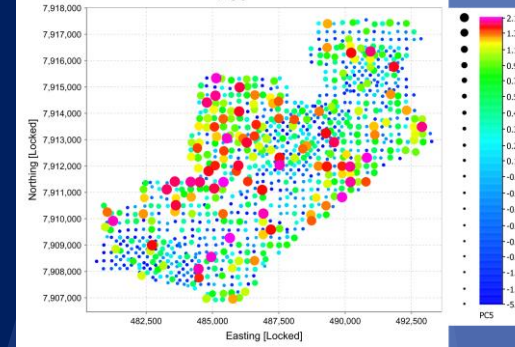
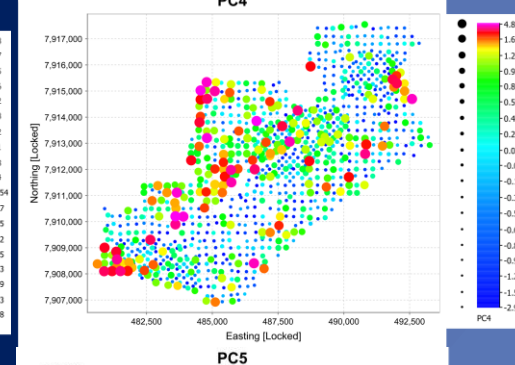
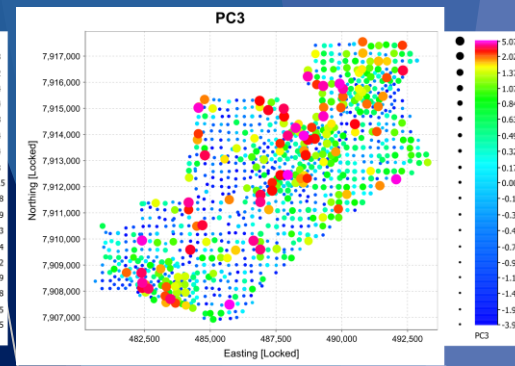
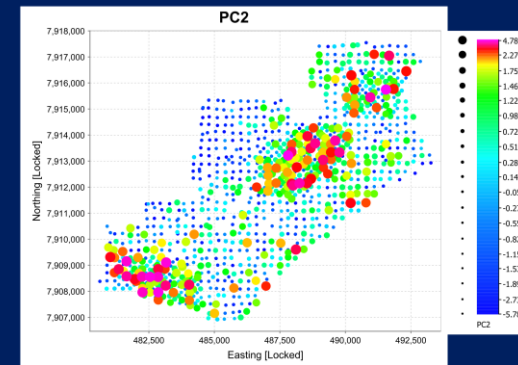
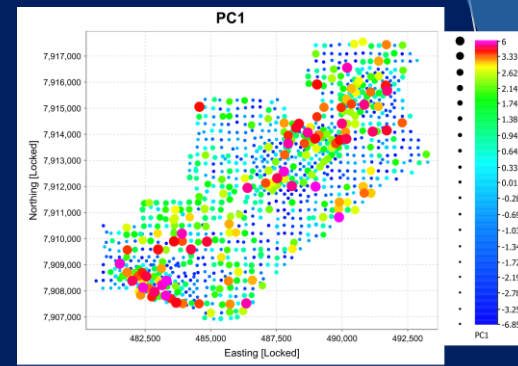
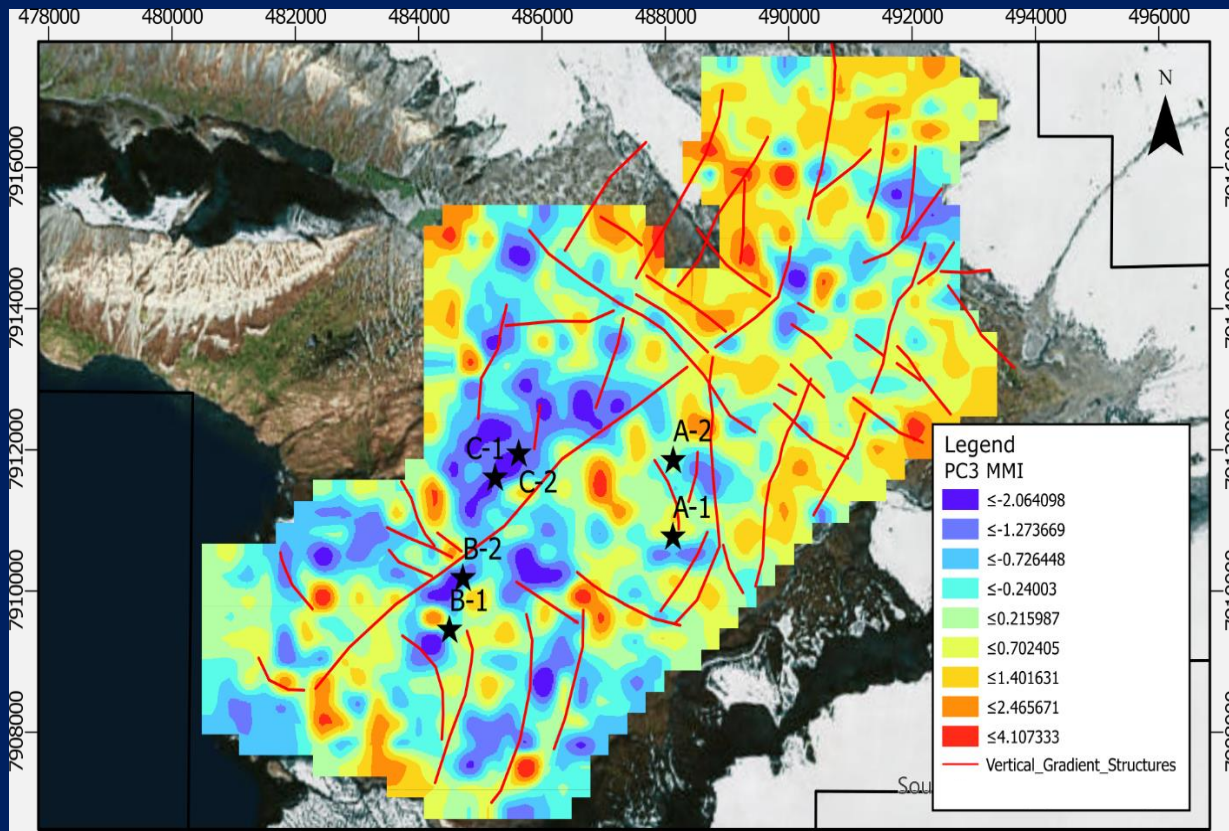
ELECTRO-  
MAGNETICS

MAGNETICS



DighemV 900 Hz (coplanar  
coils)  
anomaly map.



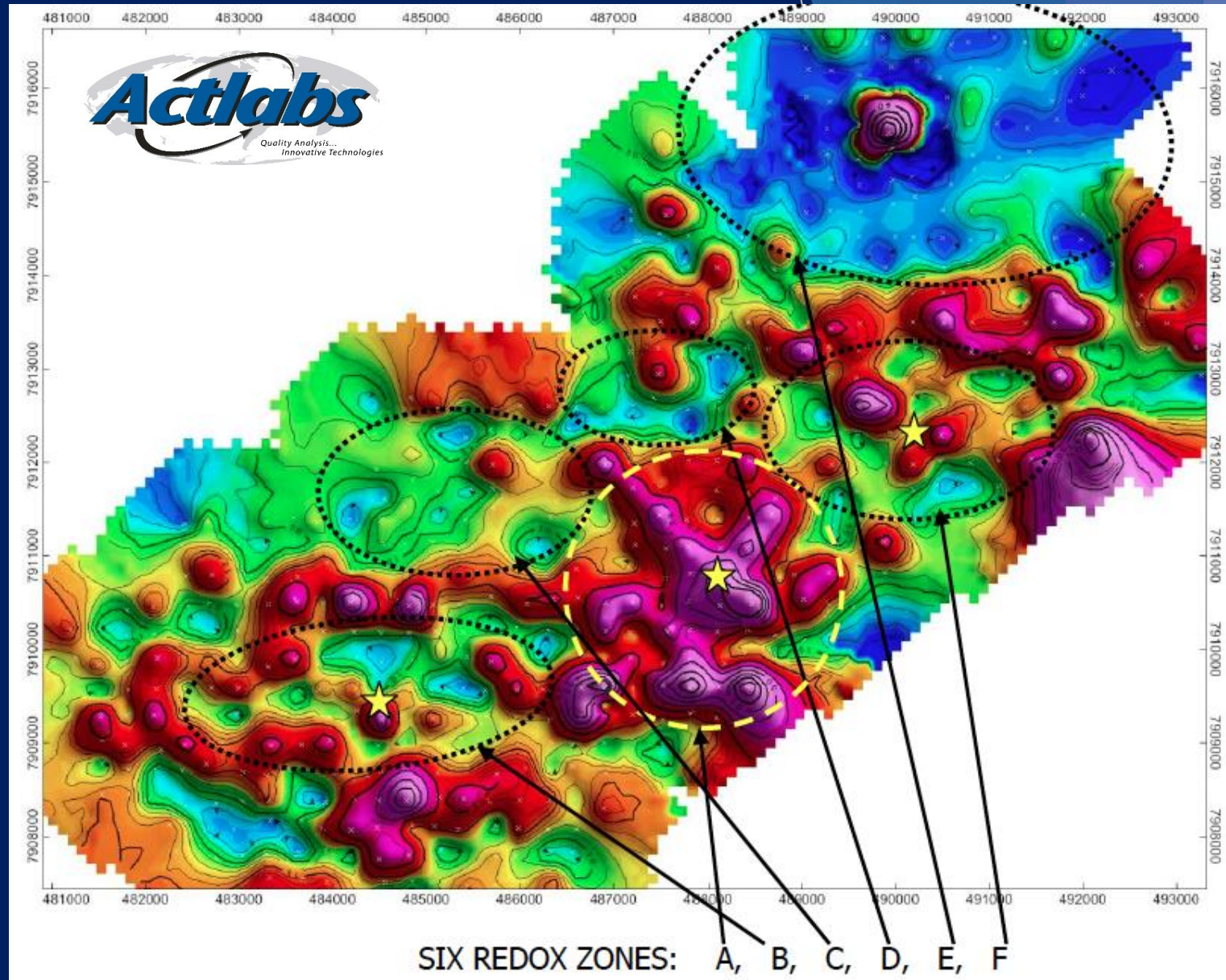


- Licence MEL 2011/31 has been covered by an MMI (mobile metal ion) and 2-acid digest (2AD) bulk soil geochemistry on a 300 x 300 m grid, with later partial in-fill on a 150 x 150 m grid.
- Interpretation by consultant Dave Heberlein (Heberlein Geoconsulting), a recognised expert in deep penetrating geochemical exploration methods.
- In collaboration with Camborne School of Mines (University of Exeter, UK), Bluejay has completed prospectivity modelling of Kangerluarsuk project, integrating both multivariate principal component analysis (PCA) of the selective leach geochemistry datasets and airborne geophysics to assist with drill target delineation and ranking.
- Results of this work along with a discussion of the 2023 drill targets will be discussed in subsequent presentations to be released by Bluejay ahead of the maiden drill program this summer.

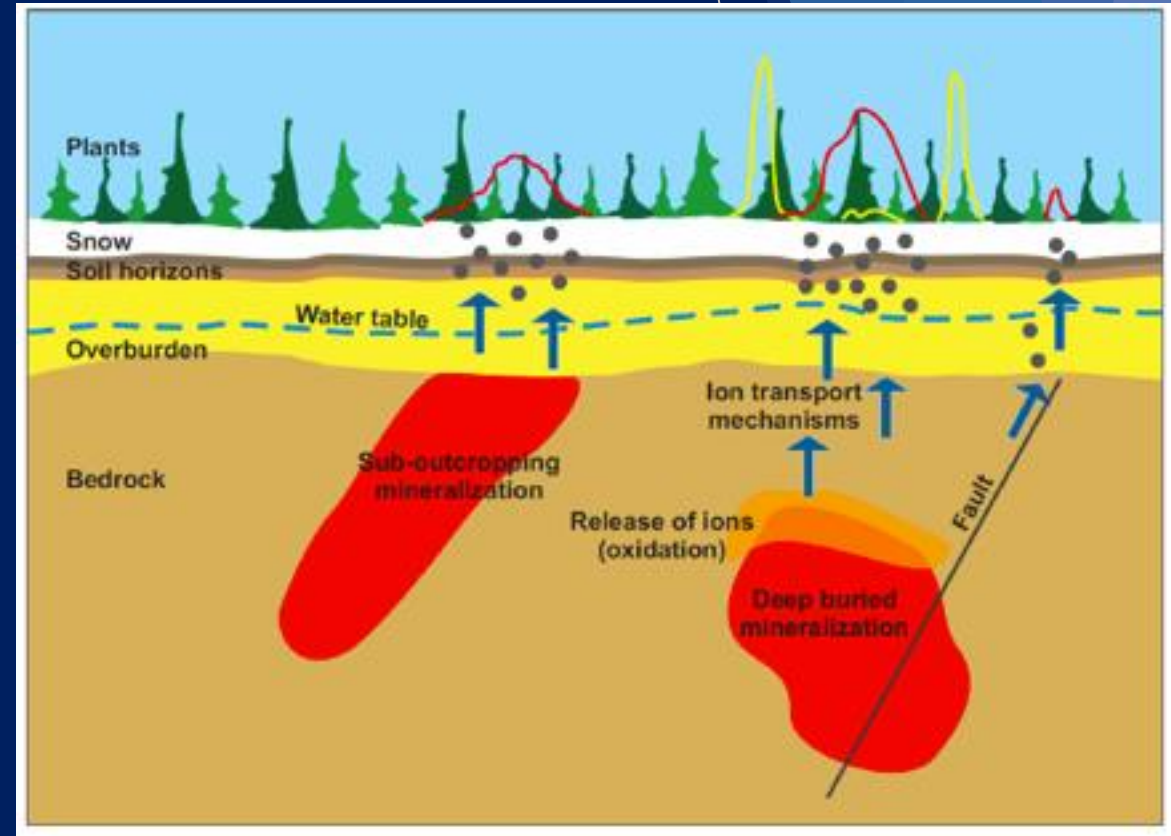
**Total samples:**  
 2AD – 887 samples  
 MMI – 954 samples

# Soil Gas Hydrocarbons (SGH) Analysis

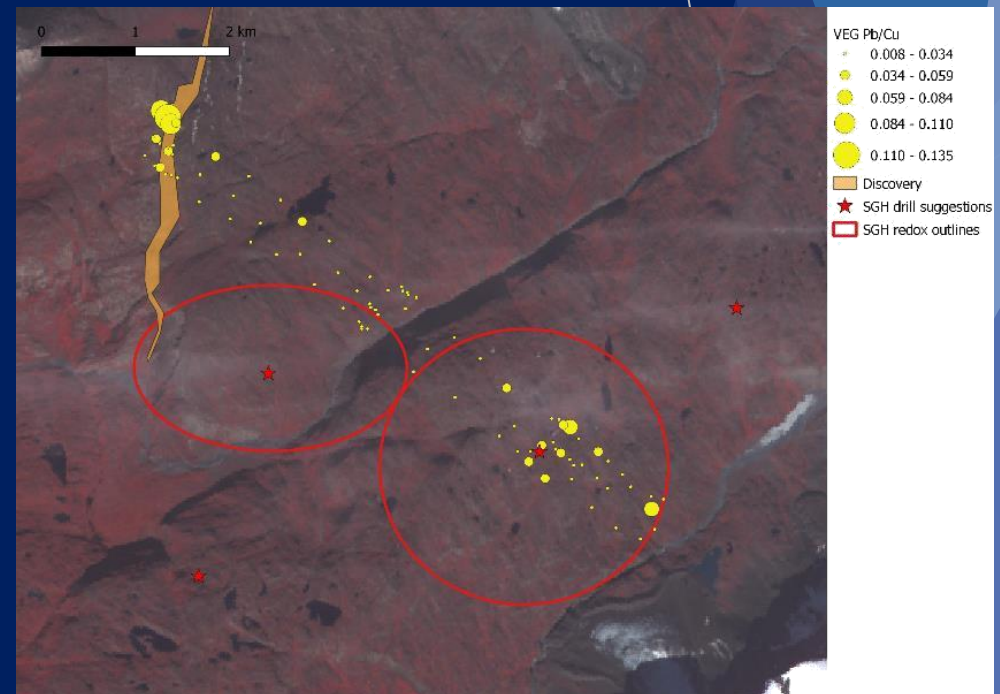
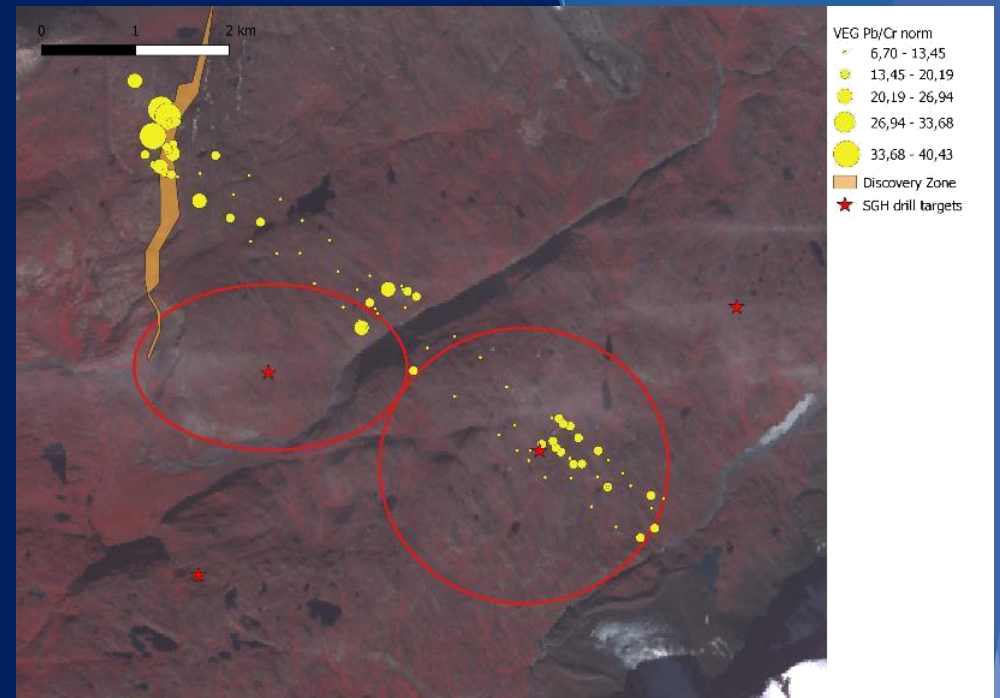
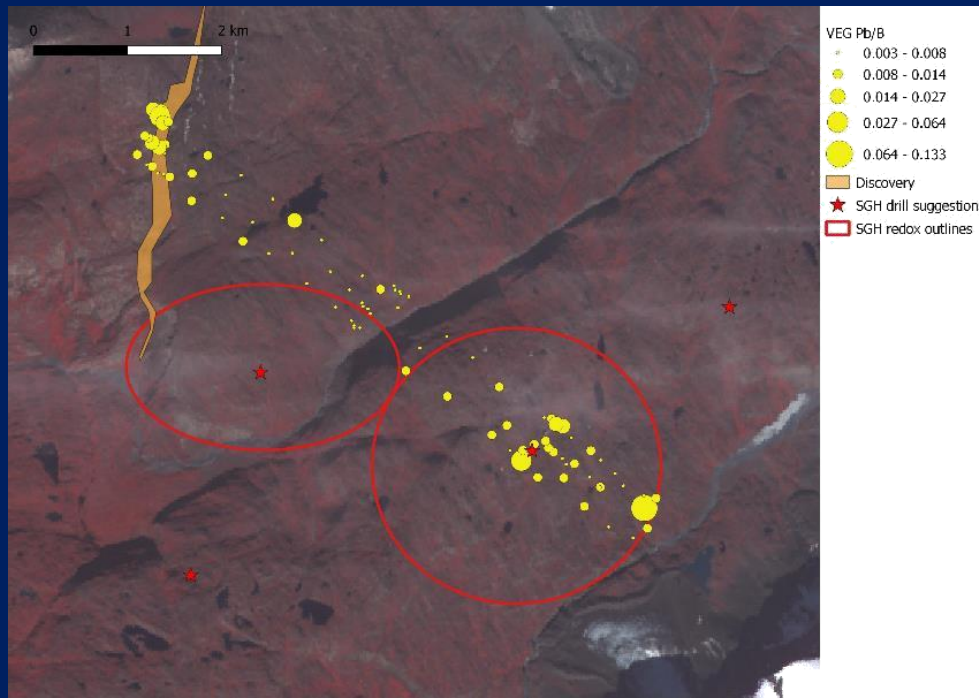
- Licence MEL 2011/31 has been covered by a soil SGH survey (611 samples).
- Interpretation reveals one highly significant anomaly ('A') which fulfils all top score requirements as a signature of a deeply buried (>500 m depth) SEDEX-type base metal deposit. Rating of 6.0 (the highest possible score in the SGH rating system)
- 'B' and 'C' are of interest because: 'C' coincides with another geochemical proxies (MMI), and both 'B' and 'C' are both associated with highly conductive bodies (identified by electromagnetics) close to the modelled basement contact.
- Verification by several independent geochemical and geophysical methods has now pinpointed multiple high-priority targets that are now ready to be drill-tested through a maiden drill programme in 2023.



- The Kangerluarsuk project area was selected by the EIT RawMaterials European Union funded ‘UpDeep’ project as a case study area.
- The UpDeep project was aimed at developing geochemical expertise and protocols for exploring for deeply buried mineralisation using surface geochemistry (e.g. MMI and biological sampling).
- In 2017, the Geological Survey of Denmark and Greenland (GEUS), an UpDeep project partner, carried out an EU-funded soil and biological sampling orientation study at Kangerluarsuk ([Johnsen et al., 2021](#)). The resulting data has been incorporated into Bluejay’s geochemical database for the project, along with the company’s existing SGH, MMI and bulk soil and stream sediment geochemistry.
- ‘UpDeep Project’ orientation study comprised 90 sample stations, including 123 biological samples (of Arctic Willow and Lapland Rose). Arctic Willow (*Salix glauca*) is a ‘hyper-accumulator’ of zinc (suitable medium for Zn-Pb exploration in northern latitudes) and ubiquitous throughout our project area.



[Click here](http://projects.gtk.fi/updeep/project/) for the UpDeep website and online data portal:  
<http://projects.gtk.fi/updeep/project/>



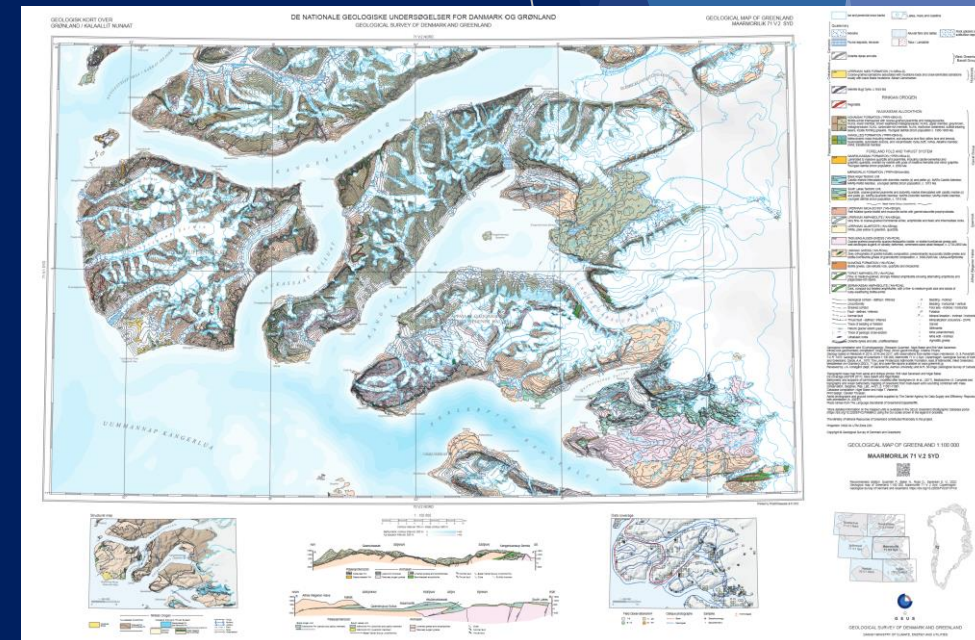
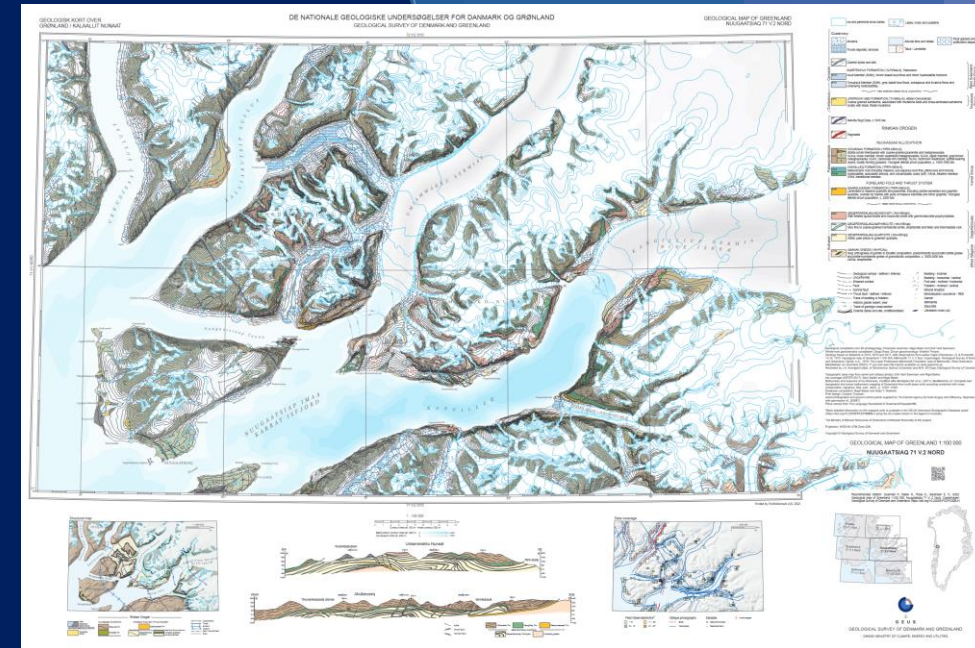
- For target elements (e.g. Pb, Ag) elemental ratios of the biogeochemical sampling data allow reduction of analytical noise and provide the strongest signals.
- The strongest signals came from the pathfinder elements, thallium and cadmium.
- Anomalies are in agreement with the strongest SGH anomaly previously identified on the property and support the presence of deep mineralisation. **Provides further independent verification of the Bluejay's existing geochemical datasets.**

# New regional mapping facilitating exploration

Bluejay  
mining plc



- Government-funded regional mapping and research initiative (co-funded by the Geological Survey of Denmark and Greenland (GEUS) and the Government of Greenland's Ministry of Mineral Resources) on the Karrat Group, from 2015 to present.
- This research programme has significantly enhanced the understanding of the stratigraphy, basin architecture and structural evolution of the meta-sedimentary and meta-volcanic rocks of the Karrat Group (that hosts Bluejay's Kangerluarsuk project).
- New geochronological, geochemical, structural, petrological, hyperspectral and 3D-photogeological data collected.
- Three new 1:100,000 scale geological map sheets produced (published in 2022) and GIS package for the Karrat Group.
- Several academic papers and MSc research thesis published on the Karrat Group, including studies specifically on mineralisation within Bluejay's licence area.
- Deliverables of the programme have allowed Bluejay to further refine the genetic model for the mineralisation at Kangerluarsuk (including an on-going dialogue and collaboration with GEUS).



New 1:100,000 scale geological map sheets for Nuugaatsiaq and Maarmorilik (GEUS, 2022)

# 2022 FALCON® Airborne Gravity Gradiometer ('AGG') Survey

[Click here](#) to see our RNS dated 14 September 2022

- A high-sensitivity, fixed-wing FALCON® Airborne Gravity Gradiometer ('AGG'), magnetic and LIDAR survey was flown by Xcalibur Multiphysics over the Kangerluarsuk project in September 2022.
- Flight lines were flown at 300 metre spacing for a total of 587 line-kilometres.
- The state-of-the-art system uses extremely sensitive accelerometers to produce low-noise, high-resolution gravity data from an airborne platform, providing several key advantages over other standard Full Tensor Gradiometer (FTG) systems.
- The AGG data provides an model of the geology based on density variations in the underlying rocks, proving a useful geophysical tool to explore for dense sulphide mineralisation. The sharp density contrast between the known mineralisation (mainly sphalerite, galena, pyrite, pyrrhotite) at Kangerluarsuk and the lower-density metasedimentary host rocks results in identifiable gravity anomalies, indicating the presence of concealed sulphide bodies - even below thick cover. Kangerluarsuk also benefits from the absence of overburden, which can otherwise impact on modelling of gravity data.



We are excited to have completed the airborne gravity survey at Kangerluarsuk. The data was acquired through the efficient cost-effective use of this platform already operating in West Greenland. This data will ultimately allow us to increase confidence in a future drill campaign at the Project.

With Zinc's inclusion in the 2022 List of Critical Minerals issued by the U.S. Geological Survey, the Company believes that Kangerluarsuk has the potential to create material value for our shareholders. We look forward to sharing the results of the survey following receipt of the analysed data.

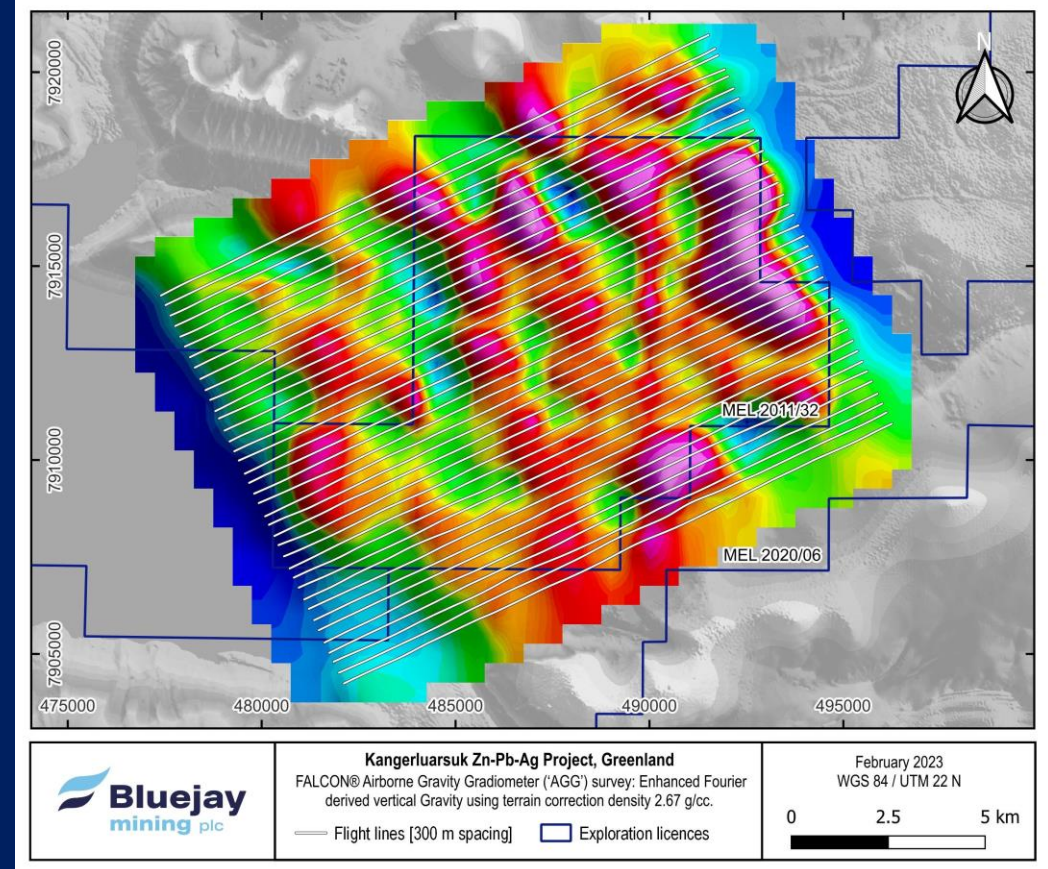
**Bo Møller Stensgaard, CEO of Bluejay Mining**



# Results of the 2022 FALCON® Airborne Gravity Gradiometer ('AGG') Survey

[Click here](#) to see our RNS dated 07 February 2023

- FALCON® AGG data received in late Q4-2022. Processing and interpretation has now been completed in-house and by Astrock Oy, Finland. The AGG data has been fully integrated with all existing electromagnetic, magnetic, geochemical, biogeochemical and geological data sets for the Project.
- The results have refined and upgraded confidence in existing drill targets at Kangerluarsuk, as well as identifying extensions to some anomalies. Assisted in drillhole placement and ranking. Positive gravity anomalies identified by the survey are coincident with conductive bodies recognised in earlier airborne electromagnetic surveys (ZTEM and DIGHEM<sup>V</sup>) and are independently supported by several geochemical proxies ((MMI, SGH and biogeochemical sampling).
- Gravity profile modelling indicates the presence of dense bodies close to the inferred basement contact, dipping gently to the southeast. These are interpreted to represent downdip extensions of the "Discovery Zone" & "Discovery Zone South" Zn-Pb-Ag mineralisation.
- The results have commercially de-risked the opportunity to strongly justify further progression of the Project.



The FALCON® airborne gravity data collected last summer has significantly improved confidence in our drill targets at Kangerluarsuk. We now have multiple independent datasets that support the presence of sulphide mineralisation at depth. The Project is yet to be drilled, despite its proximity to a past producing lead-zinc-silver mine and the presence of outcropping high-grade mineralisation within our licence area. We expect to provide an update of future plans for this project, later this month.

Bo Møller Stensgaard, CEO of Bluejay Mining