

The Taartoq gold field, South West Greenland

The gold potential of the Taartoq area is apparent and significant, judged from several showings hosted in different parageneses and associations. Since the discovery of the main gold occurrence in the area in 1971, a number of companies have devoted substantial resources to assessing the ore potential. GEUS has included the area in regional survey projects since the 1950s. The Taartoq gold field is so far representing the only South Greenland Archaean hosted gold mineralisation with average gold grades of 8–15 g/t, reaching up to a maximum of 50 g/t gold.

Geological setting

The Taartoq area, located in the heart of South West Greenland, is considered as the Archaean foreland composed of high-grade gneisses and greenstones (the 'Tartoq Group'). The environments for gold deposition are sequences of volcano-sedimentary supracrustal rocks, which rest unconformably upon the Archaean gneisses of low to medium metamorphic grade.

The metavolcanics and metasediments are several kilometres thick and are observed as dark green and rusty greenstone layers. The Sermiligaarsuk fjord displays several outcrops of 'Tartoq Group' rocks and gold showings.

The basement gneiss has ages ranging from 2980–3500 Ma, and Taartoq greenstones are assumed to be late Archaean, deposited between 2500 and 3000 Ma.

The northern area (Ilerlak) forms a tectonic enclave of greenstones within the basement. The main part of the eastern and south-eastern area is composed of monotonous greenstones. A characteristic feature of the Ilerlak sequence is the abundance of acid meta-tuffs, mostly sericite schists.

The southern area (Nuuluk) includes a prominent zone of high-strain rocks - the Nuuluk Linear Belt. The belt is 400 x 4000 m, and is characterised by nearly parallel structures and numerous thrusts. This sequence is composed of mixed layers of brown weathered carbonate schist, nodular greenschists and highly sheared volcano-chemical sediments including iron oxide schists, graphitic shales and sericite schists.



Nuuluk gold locality within the greenstone of the 'Tartoq Group' south of the fjord Sermiligaarsuk, South-West Greenland.

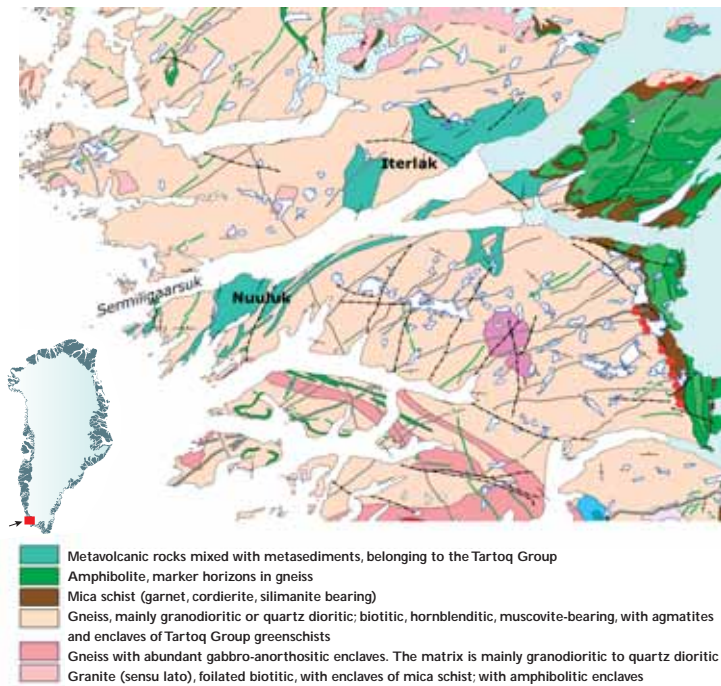
Gold occurrences

Several gold occurrences are located within the Taartoq metavolcanics reaching up to 50 g/t gold (over 0.6 m). Gold occurs in pyritiferous quartz lenses and veins in carbonatised shear zones, in pyrite-arsenopyrite-quartz layers with gold grades around 8–15 g/t, and low grade gold associated with banded iron formations. Other types, only located in the southern area, involve copper bearing parageneses with chalcopyrite, tennantite, and chalcocite in concordant veins and lenses (grades up to 8 g/t gold). Locally, pyritic schists with varying graphite content carry spahlerite and increased gold values of 2.5 g/t (and up to 6.7 % zinc).

Gold mineralisation is above all confined to linear belts and carbonate-rich zones. The gold is some times visible as discrete droplets within the sulphides on the micro scale as well as in non-sulphide associations.

Gold is thought to have been introduced into the Taartoq greenstones during the formation of stratiform exhalites with massive-sulphide and chert as sulphide facies BIF. Regional metamorphism resulted in recrystallisation and segregation of the chert into compact bodies of quartz and residual massive-sulphide. Subsequent episodes of shearing and intensive carbonate alteration along the shear zones lead to the liberation and precipitation of gold.

The ratio between the content of gold and silver (true fineness) has been calculated for some of sulphide parageneses in the Nuuluk area. It is noticeable that the gold fineness decreases from layers with arsenopyrite-pyrite (990) towards the tennantite (720) and the chalcopyrite (500) lenses, thus pointing to a trend in mobili-



sation of the silver during later diagenesis and hydrothermal processes.

The gold occurrences in the Tartoq greenstones are assumed to be deposited between 2500–3000 Ma, and are the only known Archaean gold mineralisation in South Greenland.

Gold exploration

An extensive exploration activity has been carried out in the 1000 km² area, including several drill programmes and geophysical surveying. Renzy Mines Ltd, Cominco Ltd, GREENEX A/S and NU-NAOIL A/S carried out most of the exploration projects from the 1970s to the 1990s, whereas GEUS has conducted general and specialised survey work since the 1950s.

Among the geophysical exploration results is a remarkable feature of the Nuuluk area with a significant VLF anomaly in the Western Carbonate Zone. Pyritic schists with graphite and banded sphalerite are observed in both the northern and southern portion of the zone. The geophysical anomaly suggests a large conductive zone, which could be equivalent to a sulphide body in excess of 20 million tons of zinc ore. Limited follow-up of the anomaly located graphite rich layers as conductors only.

Short hole drillings (Winkie) were initially carried out in 1982, with 23 holes totalling 460 m. Later, the two most impressive occurrences in the Nuuluk and the Ilerlak areas have been core

drilled. Work to drill 13 holes totalling 1364 m down to a maximum of 120 m was carried out in 1993.

Regional geochemical mapping and study of the pathfinder As outline the field with a gold potential. Additionally, elevated Zn values in stream sediments characterise the area where the gold mineralised Archaean greenstones are observed.

Concluding remarks

Gold occurrences in South Greenland are demonstrated to be located within the Archaean 'Tartoq Group' rocks, similar to major gold camps in 'old' greenstone

belts throughout the World. During exploration activity in the 1980s and the 1990s, knowledge about the gold field was increased and refined since the discovery in 1971, and, consequently, the potential for locating viable gold deposits here has improved.

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