

The Flammefjeld molybdenum prospect, East Greenland

Flammefjeld is a molybdenum prospect with geological characteristics indicating that it could conceal a world class deposit comparable in size to Henderson or Malmbjerg.

Flammefjeld is a 938 m high mountain situated at 68°15' N lat. on the east coast of Greenland at the margin of the c. 50 Ma old Kangerdlugssuaq alkaline intrusion. The presumed youngest intrusive rocks comprise the 39.6 Ma subvolcanic Flammefjeld complex that intruded into quartz syenites at the contact between the Kangerdlugssuaq intrusion and satellite intrusions. The Flammefjeld complex comprises a 500x800 m² composite breccia pipe intruded by quartz-feldspar porphyries and surrounded by a halo of hydrothermal alteration displaying vivid yellow and red oxidation colours, and distal hydrothermal veins. The name Flammefjeld translates as 'Flame Mountain'. The igneous breccias are of various types, of which one is clearly intrusive. The quartz-feldspar porphyries occur as breccia fragments, as a major intrusive body and as late dykes.

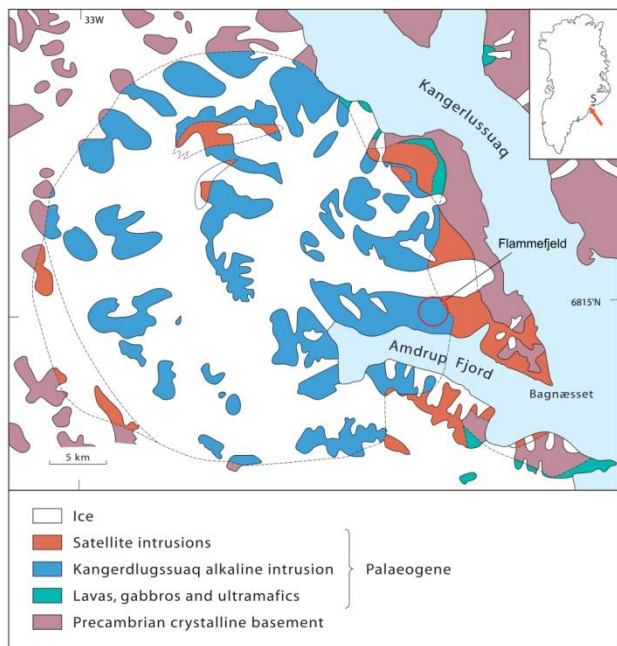


Figure 1: Flammefjeld location

Only surface investigations have been carried out on Flammefjeld. These include geological mapping and sampling, and geochemical surveys using rock chip samples and stream sediments. The existence of a major stockwork molybdenum mineralisation below Flammefjeld is indicated by the geochemical distribution of molybdenum and tungsten, by the patterns of wall-rock alteration (quartz-sericite, pyrite and argillic alteration), and by the occurrence of stockwork-type molybdenite mineralisation in breccia fragments. Analyses of ten mineralised breccia fragments range from 0.04 to 0.4 wt % Mo with an average of 0.17 wt % .



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Figure 2: Flammefjeld seen from the Southwest showing proposed drill site at base of snow-field giving access to the centre of the breccia complex.



Figure 3: Flammefjeld seen from the east. The base of the cirque is a source of abundant in-situ breccias clasts containing net-veined molybdenite with Mo content up to 0.4 wt %.

Exploration Potential

The proposed conceptual model envisages a blind Climax-type porphyry-molybdenum deposit situated 400–800 m below Flammefjeld. The proposed ore body is an inverted-saucer shaped with a diameter of 800 m, a thickness of 200 m and grades in excess of 0.2% Mo. This model can be tested by two 700-900 m drill holes.



Figure 4: Example of net-veined molybdenite in a granitic breccias clast with total Mo concentration of 0.4 wt% Mo. Clasts like this are typical in the central part of the breccia complex.

Given a target size of 200 M tonnes at 0.2 % Mo, annual production at a mining rate of 20 kilotonnes/day would be 14.6 million tonnes Mo / year. Based on what we know about Flammefjeld this is not an unrealistic “dream target”, which would make Flammefjeld a top league producer.

There is, however, still considerable geological uncertainty at Flammefjeld and it should be considered a high risk – high reward target.

Observations that support the existence of a target are as follows:

- The presence of molybdenite-veined clasts of felsic rock (granite, qtz-porphyrines, aplite) containing up to 0.5 wt.% Mo in the breccia pipe.
- Presence of a large sulphur anomaly (minimum 10MT) consisting mainly of pyritization within the Flammefjeld breccias and porphyry complex, and particularly visible in the yellow-red stained zone at the contact with the hosting quartz syenite, around the exposed part the circular intrusion, about 800 m in diameter.
- In-situ breccias clasts that have net-veined Mo-mineralisation are situated far apart on the mountain, defining a diameter of around 600 meters at an elevation of around 700 meters. This is consistent with either a large footprint for the source region, or with several source bodies.
- The size of the breccia pipe complex and associated porphyry intrusions and implied energy release indicates a large system at depth. The scale of the breccias pipe/porphyry complex is comparable to Henderson.
- Polymetallic Pb-Zn-Cu-Ag-Au veins are locally emplaced along quartz porphyry dikes and cross-cut the complex. They are clearly related to the same system on the basis of metal zonation and spatial location. These features are typical at the margins of large porphyry systems.

The existence of quartz porphyry and aplitic dikes and sheets, and evidence for multiple episodes of breccias and dike emplacement are typical of mineralized porphyry systems. A possible model that is consistent with, but not confirmed by, the present observations is as follows: a) An early phase of Mo-mineralisation, as evidenced by clasts within the breccia pipe is present at high level (300-500 meters). The chances of this providing an economic resource are not high, in part because the breccias pipe has likely removed or destroyed much of the ore. b) That both the exposed pyrite-mineralized breccias themselves and the pyrite-mineralized porphyry intrusions into the breccias originate from a deeper intrusion that is likely associated with a molybdenite stockwork of substantial size. This is further supported by the outlying veins

such as Tågegång which show no signs of bottoming out at present erosion levels (almost to sea level). This intrusion may be located near sea level, but there is a risk it could be deeper. A good analogy for the Flammefjeld system is the the Urad Mo orebody, post-mineral breccias, and the deeper Henderson Mo orebodies.

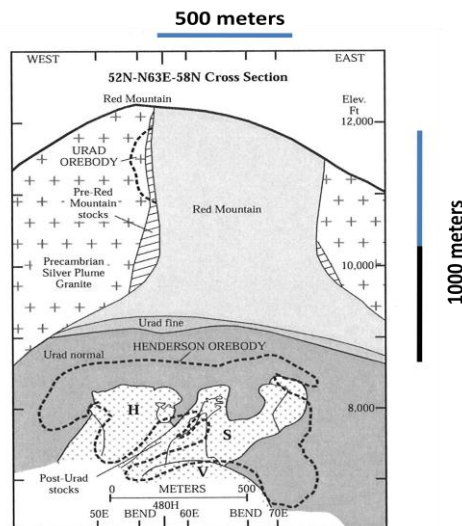


Figure 5: A cross section of Red Mountain and the Henderson ore body from the paper by Seedorff and Einaudi (Econ. Geol. , 2004, vol. 99, p. 39-72). It is notable that the scale of the structures at Flammefjeld are similar to Henderson.

Drill location and strategy.

Two locations are identified: a) the original location proposed by Geyti and Thomassen below a snow field at the West side of the massif at 800 m. b) At the 2010 camp site at 600 m. Both locations have sufficient water and space for drill platform and other infrastructure. Drilling should aim to 1) hit the high level source of existing mineralized breccias fragments 2) locate the root zone of the breccia and porphyry complex. Final collar location should be based of careful analysis of map data combined with 3-d modeling.

Pre-Avanna exploration

1970. Flammefjeld discovered by Nordisk Mineselskab A/S (Nordmine).

1982. Detailed mapping and sampling of Flammefjeld by a Nordmine team revealed stockwork-type molybdenum mineralisation in granitic breccia fragments in a major breccia pipe. Enhanced silver and gold values were registered in nearby base metal veins (Geyti & Thomassen, 1984).

2000. The Au-Ag-Pb-Zn-Cu-bearing hydrothermal veins surrounding Flammefjeld were investigated by a team from the Geological Survey of Denmark and Greenland (GEUS) (Thomassen & Krebs 2001).

2005–09. Exploration licence was held over the area by International Molybdenum plc. Reconnaissance site visit only.

For further Information

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