

Newly Discovered Cu-Ni-Sulfide Mineralisation in the 1.8 Ga Stendalen Mafic Intrusion, Ketilidian Orogen, South Greenland

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The Stendalen layered mafic intrusion, Greenland, is a 17.5 km², ca. 1300m thick, saucer-shaped meta-gabbroic intrusion hosting prospective magmatic sulfide mineralisation. Stendalen lies within forearc sediments of the accreted Ketilidian orogenic belt on the south margin of the North Atlantic craton. Zircon U-Pb dating of the intrusion has yielded a precise primary crystallisation age of 1804 ± 1.5 Ma; placing Stendalen late within calc-alkaline Julianehåb igneous complex magmatism and indicating emplacement occurred immediately prior to the Ketilidian deformation recorded in the forearc. The mineralisation is considered an atypical magmatic sulfide occurrence, having formed in an arc setting. It appears to share characteristics with similar deposits in the Svecofennian orogenic belt (e.g. Kleve, Älgiden, Espedalen), including low PGE tenors. This is the first study assessing the petrography and mineralisation of the intrusion, utilising drillhole data, field-mapping, thin section and SEM-EDS analysis.

Petrographic analysis shows the intrusion is dominated by plagioclase and hornblende which was largely recrystallised during peak HT-LP Ketilidian metamorphism. The intrusion is underlain by S- and graphite-bearing metasediments which are potentially integral to the generation of mineralisation. The intrusion is extensively crosscut by peraluminous, syn- to late-tectonic granites and granodiorites. Early drilling results reveal that the upper section of the intrusion contains minor disseminated sulfides. Towards the base, the gabbro is taxitic and displays a variety of sulfide textures. The sulfide assemblage comprises pyrrhotite-chalcopyrite-pentlandite with Cu>Ni. The timing of emplacement relative to metamorphism and deformation raises the possibility of sulfide re-mobilisation, currently under investigation.