

Dating and Trace-Element Characterisation of Sn-W Skarn-, Greisen- and Vein-Type Occurrences from East-Greenland

Nynke Keulen, Benjamin Heredia, Sebastian N. Malkki, Tonny B. Thomsen, Diogo R. Rosa, David Whitehead

GEUS - Geological Survey of Denmark & Greenland, Copenhagen, Denmark

Different deposit types, such as skarns, greisen, and vein-type each have their own unique mineral trace element compositions in ore minerals like scheelite or cassiterite. A good understanding of compositional trends in these minerals can serve to assess what deposit types are expected to be found upstream from analysed stream sediment or till samples, and thus assist in mineral exploration and in the unravelling of the geological history of orogens.

The traceability of Sn- and W-minerals to their deposit type (skarn, greisen or veins) was tested on rock samples and stream sediments from East Greenland. Scheelite and cassiterite grains from nine occurrences were analysed for their host rock mineral assemblage and geochemical fingerprint (trace elements and dating by laser-ablation inductively coupled plasma mass spectrometry). Rock samples from eight localities were collected from skarn, greisen or vein occurrences, while the ninth sample represent loose blocks transported by a glacier and thus has an unknown origin. The mineralogy of the samples was investigated with automated quantitative mineralogy (AQM) and the trace element compositions of minerals were compared to trace element values for the same deposit types, as published in the literature. Additionally, the U/Pb-dates for scheelite, cassiterite as well as zircon, apatite and rutile presumed to have formed during the same mineralising events were used to estimate the timing of the mineralisation. AQM observations on the thin sections match well with trace element data and reveal a variety of mineralisation styles within and between occurrences. In addition, new dates of the minerals reveal a more complex mineralisation history than previously known, seemingly comprising three events during the Caledonian orogeny.