



The Archaean craton and Palaeoproterozoic mobile belt in South-East Greenland: an overview of our current understanding

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South-East Greenland (62°–67°N) is one of the lesser-known regions in Greenland, having seen only limited geological investigations and no systematic sampling programmes. The region encompasses the Archaean North Atlantic craton (NAC-SEG, 62°–64°30'N), the Palaeoproterozoic Ammassalik mobile belt (AMB, 64°30'–67°N), and around 66°–67°N the Palaeogene intrusions of the Kialeq region.

To improve the geological understanding and open up the region for mineral exploration GEUS and the Bureau of Minerals and Petroleum have undertaken an assessment of the region. The first two years, 2009 and 2010, were used for regional systematic stream and water geochemistry, till indicator mineralogy, and geological reconnaissance. The results from the 2009 program, that focused on the NAC-SEG, are released to the public. Results from the 2010 program, which focused on the AMB, will be released early 2011. All this and previous data forms the basis for preliminary compilations and interpretations, and work planned in the region until 2014.

The NAC-SEG is subdivided into the Northern Zone (NZ), the central Skjoldungen Alkaline Province (SAP), and the Southern Zone. The boundary between the SAP and the NZ may represent a major tectonic boundary between two Archaean terrains. It consists mainly of TTG gneiss interleaved with supracrustal belts that are up to 1 km wide and continue many kilometres along strike. The gneiss comprise ultramafic sheets and an early tonalitic-granodioritic generation, intruded by syn- to late-tectonic granitic to granodioritic sheets. The gneisses and supracrustal rocks are deformed and affected by amphibolite- to granulite-facies metamorphism. Agmatization is wide-spread. One of the major characteristics of the region is the presence of the late- to post-tectonic (2700–2660 Ma) alkaline intrusions of the Skjoldungen Alkaline Province (SAP) in the central part of the NAC-SEG. The province comprises at least 20 intrusions of variable size and composition. The most alkaline being the late-tectonic Singertât carbonatite-bearing complex in the fjord Kassortoq. Syenitic gneiss is common south and west of Kassortoq and at the western part of the island Skjoldungen.

The boundary to the Palaeoproterozoic AMB to the north is sharp as defined by strong deformation of a major E-W oriented Palaeoproterozoic dyke swarm. A proposed Palaeoproterozoic suture zone in the Sipportoq area west of the town Tasiilaq divides the AMB in a northern and southern terrane. Supracrustal rocks and Palaeoproterozoic intrusive rocks are more common in areas north of the suture, including a pronounced belt of syn-tectonic norite-diorite intrusions of the Ammassalik intrusive complex (AMIC). The intrusions are intruded into an imbricated supracrustal succession of garnet-rich paragneiss and amphibolite, which are strongly anatectic. Supracrustal rocks are common further north where they comprise graphite- and sulphide-rich units, marble and calc-silicate units, and allumosilicate-bearing gneisses. They are interleaved by reworked granitic to tonalitic gneiss, probably of Archaean age. High temperature and pressure conditions affected large parts of the AMB. The southern part is mainly in amphibolite facies whereas, further to the north, the gneiss is often characterised by patchy retrogression from granulite to amphibolite facies. Post-tectonic intrusions including a suite of granite, granodiorite, diorite, and gabbro occur north of the AMIC. These are in form a batholith and are general undeformed and post-date the regional deformation and metamorphism with 200-300 Ma.

The presentation will summarised available geological knowledge on South East Greenland and present some key-results and regional interpretations based on the geochemistry of the regional stream- and water data, as well as some of the results of the geological reconnaissance. The results will be used to present a preliminary tectonometamorphic model for the region and evaluation of the mineral potential.