# Pro- and retrograde igneous activity during the Neoarchaean Skjoldungen Orogeny in SE Greenland

T. NÆRAA[1*], L. BAGAS[2], J. TUSCH[3], T. F. KOKFELT[4] AND C. MÜNKER[3]

[1]Lund University, Lund, Sweden (*correspondence: tomas.naeraa@geol.lu.se)
[2]University of Western Australia, Perth, Australia
[3]University of Cologne, Cologne, Germany.
[4]Geological Survey of Denmark and Greenland, Copenhagen, Denmark

The Archaean basement in the Skjoldungen region in SE Greenland can be divided into a northern part dominated by mafic belts and ortho-gneisses (2850-3050 Ma) and a southern part with abundant younger (2760-2710 Ma) granitoid bodies. Granulite facies metamorphic overprinting is widespread within the mafic belts and in most cases pre-dates the granitic intrusions. Mafic and ultramafic alkaline intrusions of the Skjoldungen Alkaline Province (SAP) [2] define a roughly 30 km wide belt that separates the northern and southern region. The region was previously divided into two orogenic events: one at 2800-2780 Ma and one 2750-2700 Ma [1], however here we argue that these periods reflect the pro- and retrograde path during one single orogeny.

This study presents new zircon U/Pb, Hf and O isotope data from granitic and gneissic rocks and whole rock Lu-Hf isotopes from mafic alkaline intrusions. Zircon data from granites from the southern region show igneous inner rim domains with ages of 2800-2780 Ma and outer igneous rim domains of 2750-2710 Ma. Oxygen isotope data from core-, inner- and outer rim domains are similar and within mantle values for the most samples. Whole rock Lu-Hf data from two mafic intrusions of the SAP have isochron ages in the range of 2740-2790 Ma and εHf(t) around +1 to -1. For the region in general, combined zircon U/Pb/Hf isotope data display εHf(t) values that range between -2 and -8 and the Alkaline intrusions thus reflect a relatively juvenile endmember.

The new data suggest a geodynamic model where granitic magmatism (2800-2780 Ma) predate regional peak metamorphism (ca. 2750 Ma) [3], followed by syn- to post-tectonic granites (2760-2700 Ma) intruding during the retrograde path. In contrary to earlier interpretations [1], this model places the Skjoldungen area into a context of a single 100 Ma long orogenic development.

[1] Kolb et al. (2013) *Gondwana Res.* **23**, 471-492. [2] Bichert-Toft et al. (1995) *J. Petrology.* **36**, 515-561. [3] Berger et al. (2014) *Precambr. Res.* **255**, 774-790.