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## New U-Pb Ages for Mafic Dykes of SE Greenland

Mimmi K.M. NILSSON<sup>1</sup>, Michael A. HAMILTON<sup>2</sup>

<sup>1</sup> Department of Geology, Lund University, Lund, SE 223 62, Sweden;

<sup>2</sup> Department of Earth Sciences, University of Toronto, Toronto, M5S 3B1, Canada

The North Atlantic Craton (NAC) represents one of approximately three dozen preserved Archean cratonic fragments now dispersed globally, but its affinity to formerly neighboring supercontinent cratonic blocks remains poorly known. Bounding orogenic belts (e.g. Nagssugtoquidian, Torngat, Makkovik-Ketilidian) involve either extensive structural reworking of once rifted margins, or represent a hybrid of accreted juvenile material. Mafic dykes preserved internal to these blocks provide excellent time markers and allow for high-resolution age comparisons of magmatic and extensional histories between cratons, particularly when coupled with paleomagnetic and geochemical studies. Southern Greenland comprises the core of NAC, while Nain Province in Labrador, Canada and the Lewisian Complex in Scotland constitute fragments rifted during the opening of the Labrador Sea and North Atlantic, respectively. The preserved Archean bedrock of Greenland has experienced multiple events of Paleoproterozoic dyke intrusion: at ca. 2.50, 2.42-2.37, 2.22-2.10 and 2.05-2.02 Ga. While the bedrock geology of southern West Greenland is well studied, the Archean of remote south East Greenland has been understood at a reconnaissance level until only recently. During a 2012 expedition led by the Geological Survey of Denmark and Greenland (GEUS), over 70 mafic dykes from the area were sampled in order to better understand possible Proterozoic and younger additions and modifications to the Archean block.

Here, we present ages for five mafic dykes from SE Greenland and one from SW Greenland. Four dykes from the Skjoldungen area yield ages of  $2166 \pm 14$  Ma,  $2158.2 \pm 7.5$  Ma (both E-trending),  $2137 \pm 11$  Ma (ENE-trending) and  $2124 \pm 11$  Ma (NE-trending). The latter is indistinguishable from an age of  $2124.9 \pm 9.0$  Ma for an E-trending SW Greenland dyke from the Nuuk area. This younger generation of dykes was previously unknown from the Greenland portion of North Atlantic Craton, but has temporal equivalents in northern Nain Province:

$2121.0 \pm 1.5$  Ma ENE-trending Tikkigatsiak dykes and likely correlative, regionally extensive ENE-ESE-trending swarms of dykes (Napaktok, Domes), extending to  $2142 \pm 2$  Ma Avayalik dykes in northernmost Labrador (Hamilton et al., 1998; Connelly, 2001). In north-central Labrador the gabbro dykes are associated with a major anorthosite-diorite-monzonite plutonic complex (Arnanunat Suite) emplaced between 2135-2109 Ma (Hamilton, 1998; Ryan et al., 1999). 2165-2140 Ma dykes in SE Greenland may be related to the Iggavik suite of dykes in SW Greenland, which have been estimated at  $2180 \pm 100$  Ma for the NE-trending Naujat dyke (Rb-Sr; Kalsbeek and Taylor, 1985).

A N-S-trending, 70m-thick dolerite dyke from the Tingmiarmit area in SE Greenland yields a preliminary U-Pb baddeleyite age of ca. 1630 Ma. This is in precise agreement with the 1635-1622 Ma Melville Bugt dyke swarm (MBDS) in northwest Greenland (Halls, Hamilton & Denyszyn, 2011), which they proposed to extend under the inland ice to SE Greenland. The new results confirm this, and suggest that the MBDS likely extends over a strike length of at least 2000 km. Both the Tingmiarmit dyke and the Melville Bugt swarm *sensu stricto* have a characteristic porphyritic texture with plagioclase megacrysts. This generation of dykes could be related to the PD ('Porphyritic dykes') suite described by Chadwick (1969), which trend  $120^\circ$  in the Paamiut area of SW Greenland. These were proposed to have an emplacement age of  $\sim 1600$  Ma, and if these dykes represent a subset of the MBDS, the volume and areal extent of the swarm would be immense. Current efforts are aimed at testing this hypothesis.

### References

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\* Corresponding author. E-mail: mimmi.nilsson@geol.lu.se

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