



Paleomagnetism and U-Pb geochronology of the Melville Bugt dyke swarm, northwestern Greenland, and implications for Laurentia-Baltica reconstructions in the late Paleoproterozoic

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The northwest-trending Melville Bugt dyke swarm extends for at least 1200 km along the west coast of Greenland and is made up of unmetamorphosed, coarse-grained olivine-bearing diabase dykes, many over 100 metres in width. This major igneous event has remained virtually unstudied because difficult terrain, sea conditions and ice cover make it particularly inaccessible. Three Melville Bugt dykes in the Thule region of northwest Greenland were sampled for paleomagnetic and U-Pb geochronological analysis. Two sites at the eastern end of Inglefield Bay (78°N , 72°W) may be from the same 100m-thick dyke, with samples collected approximately two kilometres apart, though the paleomagnetic directions obtained from them are distinct at the 95% confidence level. Preliminary paleomagnetic directions have a south-southwesterly declination, and an intermediate downward inclination. These results are approximately antipodal to those from a dyke sampled at Olrik Fiord, indicating a reversal of geomagnetic polarity and therefore a primary remanence. The Olrik Fiord dyke has been dated, using the U-Pb method on baddeleyite, at 1628 ± 3 Ma, identical within error to a Melville Bugt dyke dated at 1629 ± 1 Ma by Hamilton et al. (2004), located more than 1000 km to the south. The remanence direction presented here is substantially different from that previously obtained by those authors for the Melville Bugt swarm. VGPs of this age are otherwise unknown for the Laurentia paleocontinent for comparison with Baltica paleopoles of the same age. The results indicate a significant degree of motion between Laurentia and Baltica between 1630 Ma and 1265 Ma, the chronologically nearest key pole for which a reliable fit can be made (Buchan et al.

2001).