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U-Pb zircon geochronology of Caledonian age orthogneisses dredged from the Chukchi Borderland, Arctic Ocean.

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Over 500 kilos of metamorphic rock was dredged from outcrops along a steep normal fault scarp in the central Chukchi Borderland in 2009 (HLY0905) from water depths of between about 2500-1400m. The rocks in the dredge included broken angular cobbles and boulder-sized samples of amphibolites, orthogneisses, and granitoids of the same amphibolite facies metamorphic grade, as well as gravel to small cobble-sized ice rafted debris of various rock types. Zircons were separated from two of the orthogneiss samples, and single grain zircon U-Pb ages were determined by SHRIMP analysis to be 428 Ma $\pm$ 3.4 for both samples (N=60). Several zircon grains had distinct igneous cores that ranged in age from about 928-1200 Ma (n=7) with two older grains (1700, 1760 Ma).

The Caledonian orogenic belt developed in the Ordovician to Devonian affecting northern Europe, Greenland and Arctic Canada. Caledonian deformational trends continue into the Arctic and disappear at the rifted margin of the Arctic Ocean. Syn-orogenic magmatism in the Barents region date deformation in this region during the Caledonian event to have occurred between about 450-410 Ma (Johansson et al., 2005; Gee et al., 2006; Gee and Tebenkov, 2004).

Grenville age plutons (900-1250Ma) that were later involved in Caledonian deformation and intruded by 410-450 Ma aged plutons are found on western and eastern Svalbard (Johansson et al., 2005), eastern Greenland, and the Pearya Terrane of northern Ellesmere Island (Trettin,1986, 1992). The Franklinian basement of Arctic Alaska and Canada do not share these Grenvillian ages (Trentin et al, 1987). This suggests that the inherited zircon cores in the Chukchi Borderland orthogneisses were derived, at least in part, from an older Grenvillian basement like that of Pearya, Svalbard and parts of Greenland, or through sediments eroded from these sources, and later intruded by Caledonian aged granites. This constrains the pre-rift location of the Chukchi Borderland to be within the Caledonian deformational trend and possibly near Svalbard and Pearya.