



Detrital zircon U-Pb geochronology of metasediments from southwestern Svalbard's Caledonian Province

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We conducted SIMS U-Pb geochronology on detrital zircons from metasedimentary rocks of Svalbard's Southwestern Caledonian Province, including: Prins Karls Forland, Wedel Jarlsberg Land, and Sørkapp Land. Quartzite from the northernmost area, Prins Karls Forland, was collected from the amphibolite facies Pinkie Unit, which was thought to be Mesoproterozoic. Preliminary detrital zircon dating obtained for this unit yielded ages as young as early Neoproterozoic to late Mesoproterozoic (0.95-1.05 Ga), with dominant populations around 1.4 and 1.6 Ga. Samples from Wedel Jarlsberg Land were collected from the Eimfjellet, Deilegga and Sofiebogen groups, and except for one quartzite from the Gulliksenfjellet Formation (Eimfjellet Group), samples also possess ages as young as early Neoproterozoic to late Mesoproterozoic (0.9-1.1 Ga). Older zircon age signatures are dominated by Mesoproterozoic populations at ca. 1.3 Ga and 1.45-1.6 Ga, with older Paleoproterozoic ages also present. The Gulliksenfjellet Formation is characterized by 1.75-1.9 and 2.5-3.0 Ga detrital zircon ages; no detrital grains younger than 1.7 Ga are present. The samples from Sørkapp Land were collected from an unnamed complex, which is thought to be an equivalent of the Neoproterozoic Isbjørnhamna Group of Wedel Jarlsberg Land. Youngest detrital zircons of early Neoproterozoic to late Mesoproterozoic (ca. 0.95-1.1 Ga) age are abundant. The older populations are dominated by Mesoproterozoic to Paleoproterozoic zircon, with clusters at 1.3-1.35, 1.65, and 1.8 Ga. Single Archean grains were also identified. The detrital zircon age signatures for metasedimentary rocks from Sørkapp are similar to those identified within Wedel Jarlsberg Land. In summary, our data from the southwestern Svalbard's Caledonian Province indicate: a) an early Neoproterozoic maximum sedimentation age for the units; and b) a distinct late Mesoproterozoic to early Neoproterozoic provenance. The exception is the Gulliksenfjellet Formation, which forms a vestige of an older late Paleoproterozoic to early Neoproterozoic basement crust. The widespread evidence of the Mesoproterozoic to early Neoproterozoic zircon signatures for different metasedimentary rocks of southwestern Svalbard suggests that the Grenville Orogen may have continued northwards from the type areas in the southeastern Canada and southwestern Scandinavia into the high Arctic (e.g. Lorenz et al., 2012).

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References:

Lorenz H., Gee D.G., Larionov A.N. & Majka J. 2012. The Grenville–Sveconorwegian orogen in the high Arctic. *Geological Magazine* 149, 875–91.