



Detrital zircon data support a Timanian origin for the Kalak Nappe Complex, North Norwegian Caledonides

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The origin of the Kalak Nappe Complex (KNC) in the Arctic Caledonides of Norway is historically enigmatic. Psammitic rocks of the KNC traditionally are thought to have been derived from the thinned, rifted margin of western Baltica. Recently, it has been proposed that U-Pb ages on detrital zircon and on magmatic zircon from the many intrusives present in KNC suggest derivation from Laurentian (Kirkland et al. 2007) and peri-Gondwanan (Corfu et al. 2011) realms. In this contribution we argue for a third alternative.

Our LA-ICP-MS U-Pb ages on detrital zircon from the Ediacaran and Lower Paleozoic deposits (Dividal Group) in northern Scandinavia indicate that their source region was the Timanian Orogen, formed along Baltica's northeastern margin in the Late Neoproterozoic. A large proportion of the detrital zircon grains from the Ediacaran-Cambrian deposits range in age between c. 1.7 and 1.0 Ga, but a distinct population of c. 0.57 Ga old-detrital zircon is also present in several samples. The source areas for these Late Paleoproterozoic and younger zircons are unknown from northeastern Fennoscandia, but are, however, known from basement rocks (Timanides) below the Pechora Basin in NW Russia and thus is a fingerprint for sediments derived from the Timanides.

Psammitic units of the allochthonous Kalak Nappe Complex (KNC) have zircon-age populations similar to those from the Dividal Group with the exception of the 0.57 Ga zircons. If, however, the detrital zircon dates from the KNC are mixed with detrital zircons from the c. 0.57 Ga Sørøy Igneous Complex, then an almost identical zircon age population should be expected. Instead of arguing for a Laurentian or peri-Gondwana origin of KNC, as some authors do, we prefer to link the KNC to the Timanides, preferentially the northwestern part of the present exposed part of the Timanides. Incorporation of the KNC into the Scandinavian Caledonides can thus be explained by oblique rifting (transtension) between Baltica and the remaining Rodinia in the Cryogenian, followed by emplacement of KNC as a series of nappes during collision between Baltica and Laurentia in the Late Silurian-Early Silurian.