Geophysical Research Abstracts
Vol. 19, EGU2017-3860, 2017
EGU General Assembly 2017

Detrital zircon provenance from the Atomfjella Complex and Mosselhavøya Group, northern Ny Friesland, Svalbard

Jakub Bazarnik (1), William C. McClelland (2), Jarosław Majka (3,4), Karolina Kośmińska (4), and Karsten Piepjohn (5)

(1) Polish Geological Institute – National Research Institute, Rakowiecka 4, 00-975 Warszawa, Poland (jakub.bazarnik@pgi.gov.pl), (2) Department of Earth and Environmental Sciences, University of Iowa, Iowa City, Iowa 52242, USA, (3) Department of Earth Sciences, Uppsala University, Villavägen 16, 752-36 Uppsala, Sweden, (jaroslaw.majka@geo.uu.se), (4) Faculty of Geology, Geophysics and Environmental Protection, AGH – University of Science and Technology, al. Mickiewicza 30, 30-059 Kraków, Poland, (5) Bundesanstalt fur Geowissenschaften und Rohstoffe, Geologie der Energierohstoffe, Polargeologie,, Stilleweg 2, 30655 Hanover, Germany

Northern Ny Friesland is underlain by metamorphic tectonites broadly assigned to the Atomfjella Complex and Mosselhalvøya (Planetfjella) Group within Svalbard's Eastern Caledonian Basement Province. The Atomfjella Complex is dominated by orthogneiss and psammitic metasedimentary rocks exposed within the ca. 150 km long, north-south trending Atomfjella Antiform. The Mosselhalvøya Group is composed of semipelite, psammite, and subordinate marble and plagioclase-rich schist. The Mosselhalvøya Group is juxtaposed with the Atomfjella Complex along an east-dipping reverse fault.

Detrital zircons from 6 samples of the Atomfjella Complex and 2 samples of the Mosselhavøya Group were analyzed for U/Pb by laser ablation inductively coupled plasma mass spectrometry (LA-ICPMS) at the Arizona LaserChron Center. Samples of the Polhem and Bangenhuk units of the Atomfjella Complex yielded euhedral oscillatory zoned zircon grains that define unimodal peaks at 1730 and 1755 Ma, respectively. Samples from the Sørbreen and Vassfaret units of the Atomfjella Complex contained subround oscillatory zoned zircon grains with very thin CL-bright rims. Both samples define prominent peaks at ca. 1740, 1970 and 2650-2750 Ma and lesser peaks at 2400-2500, 2900-3000, and 3100-3300 Ma. A similar distribution is observed for a sample from the Smutsbreen unit of the Atomfjella Complex, but additional peaks are observed at 1230 and 1460 Ma. Zircons from the Smutsbreen sample are also texturally similar but also contain obvious rounded zircon fragments that are lacking in the Sørbreen and Vassfaret populations. Samples from the Flåen and Vildadalen Formations of the Mosselhalvøya Group yielded subround to round, oscillatory zoned grains with no or very thin metamorphic rims. Rounded zircon fragments are abundant in both samples. The zircon characteristics and age distributions of the Mosselhalvøya Group samples are similar to those from a sample of the Rittervatnet unit of the Atomfjella Complex. The three samples display prominent peaks at 1450-1500, 1640 and 1780 Ma, broad spectrum of lesser peaks at 1050-1200 and 1350 Ma, and minor peaks at 2600-2750 Ma.

The Mesoproterozoic zircon populations observed in the Flåen and Vildadalen Formations and the Rittervatnet unit suggest a common provenance for portions of the Atomfjella Complex and Mosselhalvøya/(Planetfjella) Group. The detrital zircon spectra of these units are similar to those from the Brennevinsfjorden and Helvetesflya Groups of Nordaustlandet, strengthening ties between the Nordaustlandet and Western Ny-Friesland terranes in the Eastern Caledonian Basement Province. A similar prominent Mesoproterozoic signal is also observed in the Krossfjorden Group of Svalbard's Northwestern Caledonian Basement Province. The detrital signatures from units in Northern Ny Friesland are compatible with spectra observed in North Greenland (e.g., Portfjeld Formation) and North-East Greenland (e.g., Zebra and Trekant Series), supporting correlations between Svalbard and Greenland.

This research is partially supported by the internal grant of the PGI-NRI (61.2899.1601.00.0) and partially by the NCN grant No. 2015/19/N/ST10/02646