

Zircon U-Pb-Hf isotope signature of detritus deposited on Fennoscandia /Sarmatia margin (NE Poland).

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A new combined U-Pb and Hf isotopic data, from the late Svecofennian metasediments, deposited on Fennoscandia/Sarmatia margin, before their final amalgamation at 1.82-1.80 Ga are presented. About 50 and 20 detrital zircons from two Monki and Jastrzebna samples respectively had been dated by SHRIMP II [1]. An U-Pb age results were coupled with Lu-Hf isotope data from the same zircon crystal cores. The investigated sediments were metamorphosed at 1.82-1.83 Ga, but they turned out to differ slightly in maturity and grade of metamorphism. There are two age populations of detrital material, one Paleoproterozoic at 2.1-1.9 Ga as a dominant and a subordinate Archean at 2.9-2.7 Ga. There are few outliers of the age up to 3.4 Ga in each sample. The older age population has not been matched by any proximal terrane, but the main Paleoproterozoic components expected to be from local Fennoscandian source. A new Lu-Hf isotopic measurements were obtained from the same detrital zircons to extend diagnostic evidence in deciphering potential source rocks.

Present-day $^{176}\text{Hf}/^{177}\text{Hf}$ ratio in analyzed zircons range from 0.28062 to 0.28163, at $^{176}\text{Lu}/^{177}\text{Hf} < 0.0035$. There is a strong correlation of $^{176}\text{Hf}/^{177}\text{Hf}$ at the time of crystallization and $^{176}\text{Yb}/^{177}\text{Hf}$ ratio between two samples that suggests the same source rocks. The Lu/Hf ratio varies significantly. A rare mafic source rock (high Lu/Hf ratio) crystallised at 2.0 Ga undoubtedly indicates an input of mantle material. The dominance of low Lu/Hf values suggest mostly a felsic precursor of 2.2-2.0 Ga population. Preliminary comparison of existed data reveals that the same age zircons and similar Hf isotope composition are known [2] from felsic igneous juvenile rocks that compose the north-west region of the Sarmatia.

References:

- [1] Williams et al. 2009 Precambrian Research 172, 234-254
[2] Shumlyanskyy et al. 2015 Precambrian Research 260, 39-54