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Late Palaeoproterozoic metasediments from the diffuse Sarmatia-Fennoscandia Suture (SFS) zone – their deposition, metamorphic and detritus ages

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Sedimentary basins along the Palaeoproterozoic Fennoscandian active continental margin were dominated by detritus derived from contemporaneous magmatic arc [1]. Detritus were supplied from the denudation of local crustal units. The Late Svecofennian domains close to the SE Fennoscandian margin were intruded by arc granitoids at ~1.84–1.82 Ga. Afterwards, this accretionary crust was complicated by an oblique collision between Fennoscandia and Sarmatia continents at ~1.79–1.78 Ga, which resulted in the SW-NE directed contraction. Currently, the Sarmatia-Fennoscandia suture (SFS) zone is accessible by deep drillings. Newly re-processed deep reflection seismic data of the PolandSPAN™ survey [2] revealed c. 150 km wide so-called diffuse cryptic SFS zone, where materials from two colliding plates are mixed over large distances and form a unified crust, linking two continental terrains of dissimilar pre-collisional structures.

The geochronological investigation of metasediments from drillings penetrating cryptic SFS, is intended to recognize: (1) the detrital zircon age patterns, (2) the age of metamorphic zircon, and (3) monazite, to define all differences in the age of deposition and metamorphism and possible source areas.

Most of the analytical tasks were performed using the Sensitive High Resolution Ion Microprobe (SHRIMP), but subtle variations of time metamorphism have been collected also by chemical dating of monazites on the CAMECA SX100 electron probe microanalyser (EPMA) equipped with wavelength-dispersive spectrometers (WDS). The zircon cores demonstrate that detritus was derived from the Palaeoproterozoic crust (90% of data). Moreover, the maximum age of deposition indicated by the youngest zircon grains ranges from 1.83−1.84 Ga to 1.88 Ga, suggesting distinct source areas or different blocks. Besides, monazites indicate a heterogeneous record of metamorphism from 1.82 to 1.79 Ga.

These ages provide the first unambiguous evidence for the Late Palaeoproterozoic metamorphic event in the SFS zone.

[1] Williams, Krzemińska & Wiszniewska (2009), *Precambrian Research* 172, 234-254.

[2] Mężyk, Malinowski & Mazur (2021), *Precambrian Research* 358, 106176.