



Geochemical and geochronological correlation of Svecofennian metasedimentary complexes from NE Poland, central Finland and Sweden.

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The Svecofennian Province granitoids and lesser volcanic rocks intruded into basement metasediments derived predominantly from Archean (3.0–2.6 Ga) and Palaeoproterozoic (2.1–1.9 Ga) sources (Gaal, Gorbatshev, 1987; Lahtinen 1996; Sultan et al. 2005). The age of peak regional low-pressure metamorphism decreases from 1.88–1.82 Ga in Finland to 1.85–1.80 Ga in Sweden.

The Precambrian basement of central NE Poland, which is completely covered by Phanerozoic sequences, has been sampled by deep drillings. Borehole at Jastrzebna cored 215 m of mostly paragneisses and at Monki cored 800 m of monotonous grey paragneisses interspersed with a few layers of pegmatite and intermediate to mafic metavolcanics. The paragneiss mineral assemblages are feldspar-quartz-muscovite-biotite-epidote (Monki) and plagioclase-quartz-sillimanite-cordierite-biotite (Jastrzebna). Prograde metamorphism reached greenschist facies (470°C) in the upper part of the Monki hole and amphibolite facies (570–620°C) at Jastrzebna.

The protolith of the Monki gneisses is mostly greywacke, whereas that of the Jastrzebna gneisses is shale and Fe-shale. Most of the analyzed paragneisses have uniform REE patterns and negative Eu anomalies (Eu/Eu^* 0.6–0.7) typical of post-Archean shales (PAAS). The REE contents of the gneisses from Monki are about average for PAAS, but the strongly fractionated REE patterns of the Jastrzebna gneisses, with $(\text{La}/\text{Yb})_N$ up to 63 and low values of $(\text{Gd}/\text{Yb})_N$ (3.1–4.9), are unusual. Plots of trace element abundances in the gneisses from both sites, normalized to upper continental crust (UCC), show broadly similar patterns with negative Ta and Nb anomalies.

The Monki samples have very similar REE patterns to some Finnish metagreywackes e.g. from Karhinkalliot (Central Svecofennian) and Jyrkkäaho (southern Svecofennian). Sedimentary tectonic discrimination diagrams e.g. La-Th-Sc, Th-Sc-Zr/10 suggest that most of the metasediments from the central part of NE Poland were deposited at an active continental margin or in a continental island-arc setting.

Protolith zircons from the Jastrzebna and Monki metasediments have ages mostly in the ranges 2.9–1.9 and 2.7–1.9 Ga respectively. The ages of the youngest detrital zircons and the metamorphic zircon overgrowths constrain the deposition age to the period 1.86–1.82 Ga, similar to that of sediments in the Västervik basin (Sweden) and from Tiirismaa (Finland). About 30% of the analysed Polish detrital zircon cores are Late Archaean (2.90–2.60 Ga) and about 70% Palaeoproterozoic (2.10–1.90 Ga). There is a marked lack of ages between 2.6 and 2.1 Ga. Rare older cores are present, up to 3.10 Ga at Jastrzebna and 3.52 Ga at Monki. These age distributions closely match those reported for detrital zircon from Svecofennian metasediments in Sweden and Finland. The most likely ultimate source of the Monki and Jastrzebna sediments is the Sarmatia segment SE of the present Fennoscandia, but other possibilities also are being considered.

Gaal, G., Gorbatshev, R., 1987; *Prec. Res.* 35, 15-52.

Lahtinen, R., 1996; *Geol. Surv. Finland Bull.* 389, 113

Sultan, L., Claesson, S., Plink-Bjorklund, P., 2005, *GFF* 127, 17-24