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# Mineral chemistry and petrology of monazite and xenotime in a prograde metamorphic sequence in the Kinzigite Formation of the Ivrea Zone, northern Italy

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The Ivrea Zone (IVZ) is interpreted as one of the most spectacular cross sections through an attenuated continental lower crust [1]. The regional lithology has been subdivided into three major units: (1) supracrustal rocks of Kinzigite Formation; (2) mantle peridotite; and (3) the Mafic Complex. The lowest grade rocks, in upper amphibolite facies, appear along the southeastern margin of the IVZ. The metamorphic grade increases towards the NW to granulite facies. The assembly of the rocks in their relative stacking order close to what can be seen today dates from Carbo-Permian time [2]. The amphibolite facies rocks of the Kinzigite Formation consist of metapelites and metapsammites and subordinate metacarbonates and metabasites [2]. Metapelites and metapsammites, also known as kinzigites, form a uniform 3-4 km wide tract. They are interpreted as a Palaeozoic accretionary complex.
To better understand petrological and structural relations in the Kinzigite Formation, we mapped an area in the northeastern part of the IVZ and undertook a continuous sampling every 500 m along the Strona River. The aim of the petrological and geochemical observations is to understand how the REE-Phosphates, as the most adequate minerals for U-Pb dating, respond to the increasing metamorphic conditions. Six garnet –free kinzigites have been analyzed with a focus on monazites and xenotimes. All monazites show slow decrease in LREE to Sm, after which two distinct groups can be distinguished, the first group of monazites showing negative Eu anomalies and variable Gd (3.39-6.44 wt%) concentrations, and the second group showing no anomalies in Eu concentration and higher Gd (9.92 – 11.43 wt%), Dy (1.07-1.71 wt%) and Er (0.49-0.63 wt%) content. It is observed that the Eu anomaly decreases with increasing metamorphic grade. All analysed xenotime crystals show no observable REE distribution-pattern differences. They show steep increase in LREE to Sm, relatively monotonous HREE increase up Gd and a uniform Eu anomaly.

[1] Burke M. M. and Fountain D. M. (1990), Tectonophysics, v. 182, p. 119 – 146.
[2] Sills J. D. (1984), Schweizerische Mineralogische und Petrographische Mitteilungen, v. 64, p. 169 – 191.