Timing of metamorphic, magmatic, hydrothermal and deformational events revealed by EMP total Pb dating of monazite and xenotime in the polymetamorphic Austroalpine Grobgneis complex, Eastern Alps, Styria, Austria

[1]BERNHARD, F., [2]FINGER, F. and [2]SCHITTER, F. [1]Institute of Engineering Geology and Applied Mineralogy, Graz, Austria; [2]Institute of Mineralogy, Salzburg, Austria.

The Austroalpine Grobgneis complex consists of polymetamorphic basement units with parautochthonous Permo-Mesozoic cover sequences. Electron microprobe (EMP) total Pb dating of accessory monazite and xenotime in basement samples broadly constrains the timing of the following events (all errors are 2σ).

The oldest monazite populations were found in a micaschist (323±35 Ma) and in a garnet-andalusite-biotite schist (326±24 Ma), and document amphibolite facies metamorphism during the Variscan orogeny.

Two further samples of pegmatite and aplogranite veined garnet-andalusite-biotite schist contain younger monazites (272±19 Ma and 269±15 Ma, respectively), but also a few grains with Variscan ages. Monazites within the aplogranite vein yielded 260±13 Ma. It is suggested that a Permian extensional event caused HT/LP metamorphism with growth of andalusite and the generation of granitoid melts.

Widespread hydrothermal lazulite-quartz veins contain accessory xenotime, which have been dated at 246±23 Ma. Fluid circulation could have been triggered by the Permian HT event, but the age data are not precise enough to exclude an origin unrelated to the HT/LP metamorphism.

Eo-Alpine monazites occur in Mg-rich leucophyllites, representing metasomatically altered shearzones in leucocratic orthogneisses. Ages of 98±9 Ma and 94±18 Ma were obtained, and one grain gave ca. 270 Ma, probably pointing to the age of the protolith.