

Detrital U/Pb zircon age distribution in Alpine metasedimentary rocks of the Koralpe-Wölz nappe system (Eastern Alps)

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The Koralpe-Wölz nappe system as part of the Upper Austroalpine nappes is generally characterized by high grade (amphibolite and eclogite facies) Eo-Alpine metamorphism contemporaneous or subsequent to Alpine nappe stacking. In addition, the units related to the Koralpe-Wölz nappe system were affected by Permian high-temperature – low-pressure metamorphism, basically related to lithospheric thinning subsequent to the Variscan orogeny. While the metamorphic conditions for several metamorphic events are very well constrained, very little is known about the protoliths, in particular the widely distributed metasediments, of the the Koralpe-Wölz nappe system.

In this study we present first data from U/Pb dating of detrital zircons derived from the Plattengneis of the Koralpe and from metapelites of the Rappold Complex in order to constrain potential provenance areas and maximum ages of sediment deposition.

Zircon minerals were analyzed by an Agilent 7500 LA-ICPMS system at the Northwest University (China) and with a Nu Plasma II MC-ICPMS system at the NAWI Graz Geocenter. Zircon ages ($^{206}\text{Pb}/^{238}\text{U}$) of the Koralpe show a main peak of Ordovician ages (434 Ma – 472 Ma). The youngest zircons show ages of 309 Ma. Additional age accumulations show ages of 343 Ma, 536 Ma and 604 Ma. Also represented are some ages of 946 Ma and some Paleoproterozoic zircons (1916 Ma). The age distribution within the Rappold metasediments is dominated by zircons with Cardomian ages (585 Ma – 663 Ma). Youngest ages are 333 Ma. Also some Ordovician ages (477 Ma) and some Neoproterozoic (726 Ma – 937 Ma) exist. In addition some zircons with Paleoproterozoic and Archean ages were observed (1653 Ma – 2540 Ma).

The zircon ages of these two units indicate maximum deposition ages of 309 Ma (Koralpe) and 333 Ma (Rappold). Different provenance areas for the Koralpe and Rappold metasediments could be assumed by distinctions in the zircon age distribution.