

## VARISCAN vs. ALPINE ECLOGITES IN THE EASTERN ALPS: GEOCHRONOLOGY AND ISOTOPE GEOCHEMISTRY

THÖNI, M.

Institut für Geologie, Universität Wien, Universitätsstraße 7/III, A-1010 Wien

The polymetamorphic basement units of the Eastern Alps exhibit strongly varying Alpine structural and thermal overprint with temperatures reaching from lowest greenschist to higher amphibolite facies grade. Metabasic eclogites, remnants of former oceanic crust material, occur as tectonized relics in both Alpine low and higher grade gneiss-micaschist matrix rocks.

From the **Ötztal** basement SW of Innsbruck gabbro relics within an amphibolite-eclogite series prove the derivation of some of these eclogites from gabbroid protoliths, whereas others show geochemical signatures of MORB-type basalts. Sm-Nd as well as Rb-Sr isotope data for plag-cpx pairs define a minimum age for the crystallization of the gabbros between 515 and 530 Ma. Initial values range at +5 to +8  $\epsilon$  for Nd and 0.7023 to 0.7029 for Sr. Sm-Nd mineral isochron ages (garnet, omphacite, zoisite, whole rock) from kyanite-bearing eclogites and Fe-eclogites yield a probable age for the eclogite event between 340 and 370 Ma. Garnets from sillimanite-andalusite bearing gneisses to the southwest of the eclogite zone give somewhat younger Sm-Nd ages (330 - 340 Ma). Compared with the eclogite data, these ages are interpreted to date a later stage of exhumation and pressure release. A common Variscan subduction-exhumation history may thus tentatively be constructed for the metabasite-gneiss/micaschist association in the Ötztal basement.

Eclogites exposed as pods and lenses within the gneiss to micaschist series of the **Saualpe and Koralpe**, SW of Graz, and hitherto also believed to be pre-Alpine in age by most authors, proved to have been formed during an Alpine subduction event. The exact timing for the high-P stage is difficult to assess due to isotopic disequilibrium during the eclogite stage as well as later overprinting during pressure release, but a lower and an upper age limit for this event may be derived from Sm-Nd and Rb-Sr data of the high-P assemblage. These figures range at ca. 90 and 150 Ma, respectively. In one case, where a continuous transition of gabbro into eclogite is observed on the outcrop scale, the (minimum) magmatic age of the eclogite protolith was dated by the Sm-Nd method (cpx-plag) at  $275 \pm 18$  and  $261 \pm 10$  Ma. Pb, Sr and Nd isotope signatures point to a MORB-type source for the magmatic precursors of the eclogites. The evolutionary scheme for the southeastern Alps therefore depicts a "Late Variscan" extensional regime for the southern parts of today's Austroalpine basement. This resulted in limited production of oceanic crust and may be related with the nucleation of the westernmost Alpine Tethys. In Jurassic to L. Cretaceous time, convergence processes of N. Adria and the European plate led to subduction of parts of the southern Austroalpine units to depths of 50 - 60 km. Exhumation and cooling was accomplished in the Upper Cretaceous.