EXHUMATION MODES OF AUSTROALPINE ECLOGITE-BEARING COMPLEXES IN THE VICINITY OF PENNINIC WINDOWS, EASTERN ALPS

Putiš, M.[1], **Fritz, H.**[2], **Unzog, W.**[2], **Wallbrecher, E.**[2], **Korikovsky, S.P.**[3], **Pushkarev, Y.D.**[4], **Kotov, A.B.**[4]

[1]J.A. Comenius University Bratislava, Faculty of Natural Sciences, SK-84215 Bratislava, Slovak Republic, putis@fns.uniba.sk

[2]K.F. Univ. Graz, Institute of Geology and Pal., Heinrichstr. 26, A-8010 Graz, Austria, harald.fritz@kfunigraz.ac.at

[3]Russian Academy of Sciences - IGEM, Staromonetny per. 35, 109017 Moscow, Russian Federation, konik@igem.msk.su

[4]Russian Academy of Sciences, Inst. of Precambrian Geology and Geochronology, Makarova Emb. 2, 199034 St. Petersburg, Russia

The investigated areas represent extremely shortened Alpidic domains with the buried crustal sheets, exhumed in the distinctive tectonic regimes. The applied methodological approach is based on field-mapping (Austrian GBA project 1991-1997) and some complementary structural-petrological and geochronological studies.

The Sieggraben eclogites and Grt amphibolites at the eastern austroalpine (AA) margin indicate burial conditions (DR1) at 730 °C and 14-15 kbar. The exhumation started at arised temperatures up to 770 °C and the breakdown of Om (39% of Jd) into Di+Pl symplectites. Other recrystallization minerals: Tch-Hbl, Ilm, Ttn, Bt formed at decreasing T and P. The exhumation process was controlled by dynamic strain softening in Om and Zo, then Fsp, Am, Qtz, and Qtz and Cal. Textural (U-stage and X-ray) CPO patterns document micromechanism of dislocation flow during top-to-the SSE extensional shearing (DR2). A later stage of exhumation (DR3) was enhanced with top-to-the WSW extensional shearing, especially within the underlying (lower AA) Grobgneis and Wechsel units. U-Pb lower discordia intercept 103±14 Ma (MSWD=1.1) from Zr, Mnz and Ap of the granitic orthogneiss cutting the Sieggraben metabasite-marble complex, is almost identical with the same intercept obtained from Zr of the lower AA Wiesmath orthogneiss (109±18, MSWD=1.7), both proving a Cretaceous syn-metamorphic exhumation event. A model of collision-driven structural unroofing and exhumation is fitting for this AA domain.

The central part of the Kreuzeck Massif AA basement at the southeastern margin of the Tauern Window is divided by a large WNW-ESE trending dextral transpresion shear zone representing an exhumation suture of the Polinik and Strieden Complexes. The Polinik Complex consists of HP/HT-MT eclogites, Grt amphibolites, metaultramafics, gneisses and granitic-migmatitic orthogneisses. The micaschist-gneisses of the Strieden Complex contain Ky-St-Grt-WhM assemblage, which does not bear any features of a newer overprint. Mesoscopical and CPO fabrics asymmetries confirm dextral, or top-to-the WNW simple shear. Brittle-ductile period of transpression is marked by Early Tertiary undeformed NNW to ENE oriented dikes. Extension-driven exhumation along a normal detachment fault can be documented within the austroalpine-pennine boundary at the eastern margin of the Tauern Window. The deformation of Cal tectonites during the uplift comprises mechanical twinning that transformed into dynamic recrystallization, and at last to cataclasis along the newly localized extensional shear bands. Together with asymmetric Qtz CPO patterns, both indicate top-to-the E extensional simple shear.

The outlined AA eclogite-bearing complexes appear to have been subducted within a thinned continental margin of the penninic realm and then exhumed within the AA structural complex during a long-term collision-transpression-extension events in Cretaceous to Early Tertiary.