



Basement units in the southernmost Austroalpine domain (Nötsch, Eastern Alps): Significance for Alpine-Carpathian tectonics and paleogeography

Franz Neubauer (1), Johann Genser (1), Bianca Heberer (1), Xiaoming Liu (2), Gertrude Friedl (1), Manfred Bernroider (1), and Yunpeng Dong (2)

(1) University of Salzburg, Dept. Geography and Geology, Salzburg, Austria (franz.neubauer@sbg.ac.at), (2) State Key laboratory of Continental Dynamics, Department of Geology, Northwest University, Xi'an, China

Among all distinct Austroalpine tectonic basement units of Eastern Alps and Western Carpathians, the Nötsch-Veitsch-Ochtina (NVO) unit is particularly interesting because of two reasons: (1) it comprises elsewhere unknown Lower Carboniferous clastic shallow water formations overlain by Upper Carboniferous terrestrial conglomerates and sandstones, which are interpreted to represent molasse deposits to the early Late Carboniferous Variscan orogeny; and (2) the Veitsch (Eastern Alps) and Ochtina (Western Carpathians) nappes are the lowermost units overlain by a pre-Variscan amphibolite-grade metamorphic basement unit and a Lower Paleozoic phyllitic basement, all representing tectonic units in the footwall of the Late Jurassic/Early Cretaceous oceanic Meliata suture. The Nötsch area is located between the Periadriatic and another major regional strike-slip fault (Drau Range South margin fault) in the southernmost part of the Austroalpine domain and comprises, from base to top, similar three tectonic units as the NVO unit in the north: (1) the unmetamorphic Carboniferous Nötsch Group, (2) the retrogressed amphibolite facies-grade metamorphic Nötsch basement, and (3) the rare fossil-bearing Silurian-Devonian greenschist facies-grade metamorphic Gailtal basement.

In the Gailtal basement, the U-Pb zircon age of 441.6 ± 6.7 Ma of the Dellach augengneiss represent a Silurian magmatic rock overprinted by Carboniferous metamorphism (Ar-Ar sericite ages of 321 ± 1 Ma to 345 ± 1 Ma) and a second thermal stage with a maximum age of 265 ± 3 Ma. In the Nötsch basement, U-Pb zircon ages of 480.3 ± 9.4 Ma and 442.5 ± 1.7 Ma from mylonitic orthogneisses indicate similar ages of intrusion. Ar-Ar white mica ages range from 408 ± 2 Ma to maximum 430 ± 2 Ma constraining cooling after pre-Variscan metamorphism. Biotite plateau and K-feldspar plateau ages are at 344 ± 2 Ma to 337 ± 2 Ma are overprinted by a younger event between 213 ± 1 Ma and 198 ± 1 Ma interpreted to result from an advanced stage of Alpine rifting. White mica from orthogneiss boulders of the Pölland Fm. from the Nötsch Group show plateau ages ranging from 343 ± 4 Ma to 380 ± 2 Ma and are affected by a post-depositional very low-grade metamorphic overprint.

The new data demonstrate, beside its significance for the Variscan history, that the tectonic succession of the Nötsch area at the southernmost part of the Austroalpine unit has a strong similarity to the nappe stack (including the NVO unit) of the northern Austroalpine sectors (Greywacke zone and Ochtina area). We consider, therefore, these three units of the Nötsch area as a remnant of the root zone of the basement and cover nappes in the footwall of the Meliata suture. The structural relationships demonstrate >150-200 km large-scale nappe transport of the Meliata suture remnants in the Eastern Alps and the involvement of large, hitherto undetected Cenozoic strike-slip faults in the Austroalpine structure.