

TRANSALP SEISMIC SECTION SHEDS NEW LIGHT ON THE EVOLUTION OF THE ALPINE NAPPE STACK

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This paper presents an interpretation of the northern part of the TRANSALP seismic section, where the thin-skinned thrust belt of the Northern Calcareous Alps is in contact with the thick skinned nappe stack of the Austroalpine basement units. The observation of a thrust plane separating the Northern Calcareous Alps in the footwall and the Austroalpine basement units in the hanging wall (6 in Fig. 1, Brixlegg thrust of Fig. 2) is the starting point for a new interpretation of the kinematic history of the Austroalpine units of the Eastern Alps. Following stages are discussed: (1) The Austroalpine basement units were stacked toward the west during the Cretaceous and experienced important thinning by top to east detachments in the Upper Cretaceous/Paleocene. Contemporaneous nappe stacking and subsequent folding in the neighbouring Northern Calcareous Alps was NNW-directed. Strain partitioning across deep reaching steep faults originally separating the two units is proposed to explain this discrepancy. (2) The two units with contrasting kinematic history came into contact during Eocene thrusting. An Eocene thrust plane with the Northern Calcareous Alps in the footwall and Austroalpine basement units in the hangingwall is visible in the TRANSALP seismic section (6 in Fig.1; Brixlegg thrust of Fig. 2). (3) Oligocene normal faults (5 in Fig. 1) predetermined the course of the Miocene Inntal shear zone, which cuts the Alpine nappe stack near the tectonic basement-cover contact. At depth, the Inntal shear zone runs into thrusts rooted below the Tauern window (4 in Fig. 1, Subtauern ramp and thrusts in Helvetic nappe stack in Fig.2). Miocene faulting was a result of combined thrusting and eastward escape of crustal blocks, and the thickening by thrusting is required to fill the space created by normal faulting across the Brenner detachment. In the TRANSALP section the thrust component caused significant uplift of the Austroalpine basement units.

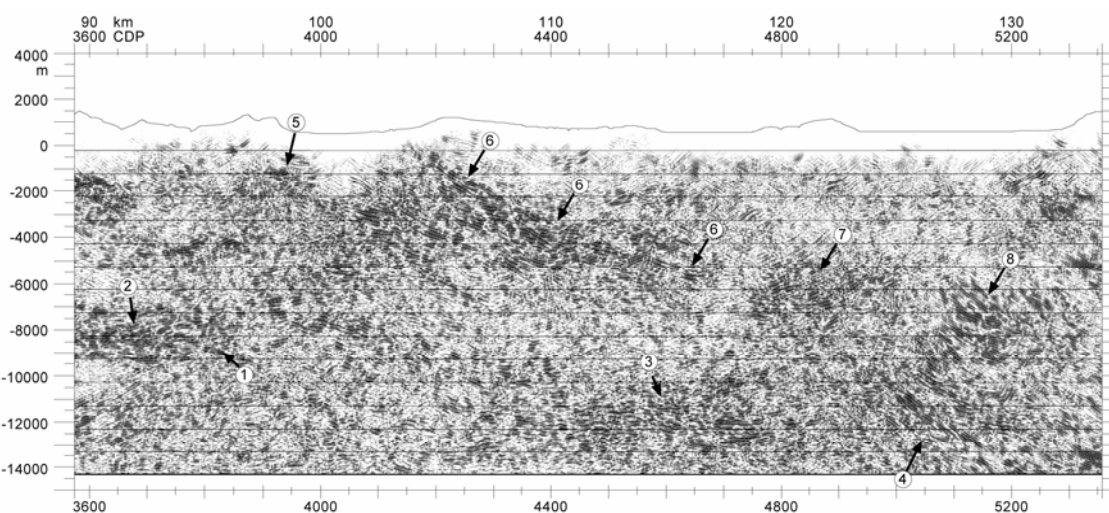


Fig. 1: The TRANSALP seismic section from CDP 3600 – 5300. A) Migrated seismogram (E. Lüschen, pers. comm. 2002). For explanation of numbers see text.

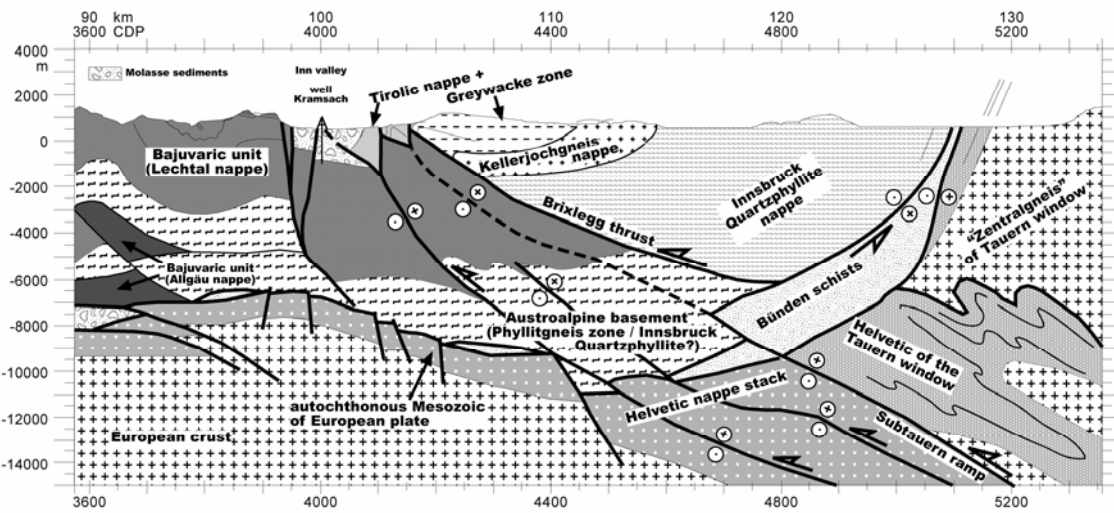


Fig. 2: Interpretation of the seismic section. Interpretation of Northern Calcareous Alps north of the Inn valley taken from Auer and Eisbacher (2003).

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