Cretaceous lamprophyre dykes in the western Carnic Alps (Southern Alps)

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Non- to only very weakly metamorphic lamprophyre dykes occur within the low-grade metamorphic sequence in the Obstanser See area of the Southalpine western Carnic Alps (Austria, Italy). No comparable dykes have so far been found in very low-grade areas of the central and eastern Carnic Alps further E. The dykes are linked to ca. N-S-oriented Alpine faults. These faults extended down to the upper mantle indicated by the dykes containing chrome spinell bearing dunitic xenoliths. Youngest fault movements have overprinted the dykes because they reveal fine slickensides with mineral fibers. From these observations, the age of the dykes must have been post-Variscan but pre-dating latest Alpine fault movements. Geochemical data suggest the dykes to be of alkaline (within-plate) affinity possibly associated with an extensional or transtensional regime, respectively. K-Ar age determinations on biotites yielded Cretaceous ages (98 ± 8, 116 ± 4, 103 ± 4 Ma). An Ar-Ar biotite plateau age of 93.2 ± 0.3 Ma was obtained from one of these samples and indicates Cretaceaous cooling with slight Tertiary overprint. We conclude that the dykes are comparable to Middle Cretaceous (ca. 100 Ma) basanitic dykes known from the southernmost Lechtal nappe in the Northern Calcareous Alps and comparable rocks from the Carpathian region of northern Hungary. Therefore, a similar geodynamic situation is concluded. The lamprophyre dykes might thus have formed in an overall extensional or transtensional environment after possible cessation of Early to early Late Cretaceous contraction in the more internal (i.e. Tethys-ward) parts of the Northern Calcareous Alps–northern Hungary–Southern Alps greater region and pre-dating thrusting and nappe stacking related to subduction of the Penninic ocean beneath the Austroalpine mega-unit.

Pressure solution – A ductile deformation mechanism seen from the perspective of theoretical modeling studies

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The main elements of a theoretical model of intergranular pressure solution (IPS) for a quartz grain/water system are sketched, beginning with an identification of the thermodynamic forces that drive intergranular dissolution, grain boundary diffusion, and free-face dissolution or precipitation processes. Ascending from the grain-scale to the macro-scale, we describe the temperature- and stress-sensitive compaction of a thick layer of sediment as a problem of coupled deformation and solute transport and we discuss preliminary results and future perspectives of a comprehensive thermo-mechanical modeling study of this process.

Magmatic rock clasts from the Visean conglomerates – evidence for a volcanic arc between Brunovistulicum and Modanubicum?

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The spectrum of the crystalline rock clasts found in the Upper Visean conglomerates of the Drahany Culm, Eastern Bohemian Massif is very broad (Kotková et al 2001). It comprises rocks representing lower (high-grade rocks-granulites), medium (amphibole to muscovite bearing granites, biotite and biotite-muscovite bearing migmatites and gneisses) and upper crust (volcanic rocks, low-grade rocks such as phyllites). Fragments of volcanic