

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 Cretaceous 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 Drahaný 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

rocks are very common in the greywackes, which form majority of the sedimentary sequence.

The pebbles of andesite-dacite-rhyolite suite were found in all members of the Culm sequence. The pebbles from the oldest conglomerates are calc-alkaline, whereas volcanites from the younger conglomerates are enriched in K and even ultrapotassic trachytes were found in the youngest members of the sedimentary sequence. Aphyric and porphyric lavas, amygdaloidal lava types, tuffs etc. were distinguished from the structural point of view. The high content of LILE along with low concentrations of HFS, especially Nb, Ta, Ti suggest that the volcanites originated in a volcanic arc environment.

Subvolcanic rocks such as tonalitic and granitic granophyres were commonly found in the conglomerates. Spectrum of plutonic rocks is even more varied. The peraluminous muscovite-biotite granites are very abundant. Observed transition between these granites and migmatites indicate their crustal origin. Amphibole-bearing granodiorites, tonalites and gabbros, representing probably plutonic equivalent of the volcanic andesite-dacite-rhyolite sequence, are less frequent. The observed cumulations of Ti and Fe oxides and mafic minerals along with the strong alteration of the rocks make the

tectonic interpretation of their geochemistry difficult. Anyhow, generally calc-alkaline character and low HFS indicate rather volcanic arc environment, too.

Durbachite pebbles commonly found in the conglomerates are restricted to the youngest members of the sedimentary sequence. They can be compared to those from the Třebíč pluton. However, the dark, melanocratic durbachites, which are common in the present erosional level, were not found in the conglomerates. Durbachites were found in spatial association with ultrapotassic trachytes. Because of their similar mineralogy, geochemistry and age (343 ± 7 Ma by K-Ar method), we interpret the ultrapotassic trachytes as being volcanic equivalents of durbachites.

The volcanic, subvolcanic and some plutonic rocks from the Culm conglomerates can be interpreted as a product of a volcanic arc, which evolved in time from calc-alkaline to high-K character. Because majority of the material found in the conglomerates has signature of its derivation from the Moldanubicum, the arc originated probably on the Moldanubian crust as a consequence of subduction of the Brunovistulian plate below the Moldanubian zone.

Geologisch-geotechnische Untersuchungen an Massenbewegungen im Wagrainer Tal / Sbg.

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Im Wagrainer Tal, SE von St. Johann im Pongau treten aufgrund von langsamen Massenbewegungen Schäden an der Wagrainer Bundesstrasse B 163 und an Gebäuden auf. Die WLW, Gblg. Pongau errichtete entsprechende bauliche Massnahmen (Entwässerungen, eingeschütteten Konsolidierungssperren), um die Tiefenerosion des Wagrainer Baches einzudämmen und die Massenbewegung zu stabilisieren.

Die gegenständliche Untersuchung im Auftrag des BM für Land- u. Forstwirtschaft, Umwelt u. Wasserwirtschaft sollen die Massenbewegungen und deren Wechselwirkungen mit den Maßnahmen unter Anwendung von geotechnischen Stabilitätsberechnungen ganzheitlich betrachten.

Die erarbeitete Basis für die Stabilitätsberechnungen stellt eine geologische Kartierung sowie die geodätische Vermessung zweier Querprofile dar. Die anstehenden altpaläozoischen Gesteine der Grauwackenzone wurden in einen Phyllit- und in einen Karbonatkomplex unterteilt, welche stellenweise von mächtigem Schutt aus Phyllitgrus und quartären Sedimenten überlagert werden. Die Nahelage der Salzach-Enns-Störung bewirkt eine entsprechende tektonische Überprägung der Gesteine. Zwei, im Wesentlichen voneinander unabhängige Bewegungsmechanismen der Massenbewegungen

konnten unterschieden werden. Einerseits ein Versagen der Festgesteine des Karbonatkomplexes auf ihrem duktilen Untergrund (Phyllitkomplex) nach dem System "Hart auf Weich" und andererseits ein Versagen der Lockergesteinsmassen (Schutt) und oberflächennaher Bereiche des Phyllitkomplexes in Form von Kriechbewegungen unter Einfluß eines tieferliegenden, langsamen Gleitvorgangs. Weitere Grundlagen für Stabilitätsberechnungen an den beiden geologisch und geodätische erfaßten Querprofilen stellen vorangegangene geotechnische Untersuchungen im Nahbereich der B 163 dar. Drei verschiedene Szenarien hinsichtlich der Geländegeometrie, mit Variationen der geotechnischen Eingangsparameter und der hydrogeologischen Verhältnisse wurden generiert. Die errechneten Sicherheiten von möglichen Gleitflächen nach den Verfahren von Bishop und Janbu zeigen für die verschiedenen Szenarien deutliche Trends. So wirken die hinterfüllten Konsolidierungssperren einerseits auf die übersteilten Ufereinhänge stabilisierend, andererseits haben sie jedoch auf höher gelegenen Instabilitäten keinerlei Auswirkung. Für die aus Inklinometermessungen beobachteten tiefgründigen Gleitungen ergibt sich eine Verlagerung der zugehörigen Gleitbahnen. Traten die Gleitbahnen im ursprünglichen Zustand im