

**Beobachtungen an den ECGN Stationen in Österreich**

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Das BEV beteiligt sich am Projekt ECGN (European Combined Geodetic Network), das von der IAG initiiert wurde, mit 3 Stationen: Pfänder, Graz, Trafelberg. Aufgabe dieses Projektes ist die kombinierte hochpräzise Beobachtung von GNSS (GPS), Absolutschwere, Präzisionsnivellement-Höhen und soweit möglich, Erdzeiten und anderen geophysikalischen Parametern, wie an der Station Trafelberg, die am Conrad Observatorium der ZAMG eingerichtet ist. An allen 3 Stationen wird permanent mit GPS gemessen, eingebunden in das Netz von APOS (Austrian Positioning System) und EPN (European Permanent Network). Absolutschweremessungen werden jährlich durchgeführt. In der Station Trafelberg läuft neben den seismischen Monitoren seit 2008 ein GWR - Gezeitengravimeter. Die bisherigen Beobachtungen zeigen für den überschaubaren Zeitbereich weitgehende Konstanz innerhalb des Vertrauensbereiches der Messergebnisse.

RUESS, D. (2005): Development of the European Combined Geodetic Network (ECGN) in Austria. - Report on the Symposium of the IAG Subcommittee for Europe (EUREF), Vienna, Austria, 1-4 June 2005 (<http://www.euref-iag.net/symposia/2005Vienna/5-4.pdf>).

**Origin of the Late Miocene-Pliocene alkali mafic  
magmas in the western Pannonian Basin - inferences  
from compositions of olivine and spinel**

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The origin of the Neogene-Quaternary alkaline mafic magmas in the Pannonian Basin is still a subject of debate, despite the vast amount of new data published in recent decades. The geodynamic models involve two main explanations: (1) magma generation is related to localised mantle plumes; (2) magma generation is due to plate tectonic processes, mostly related to extension of the Pannonian Basin. We evaluate the possible models by estimating the mantle potential temperature beneath the western Pannonian Basin. We selected three localities, where the basalts contain solely olivine phenocrysts with spinel inclusions. These basalts have high mg-values suggesting that their compositions are close to the primary magmas.

Olivines and spinels are the first products during the crystallization of basaltic magmas, therefore they provide important information on the formation of mafic magmas and the early stage magma evolution. Composition of olivines differs in the studied basalts that reflect different redox condition during the crystallization supported also by the compositions of the FeTi-oxides. The most magnesian olivines appear to be in equilibrium with the host rocks and they could be crystallized at 1250-1400°C temperature based on the PUTIRKA et al. (2007) calibration. Composition of the primary magmas was also calculated and this shows major difference compared the basalts in the inner part of the Pannonian

Basin (Ság and Uzsa) and the basalts at the western margin (Pauliberg). The latter ones have significantly higher MgO content suggesting generation from a mantle source, which characterized by higher temperature. Crystallization temperature of the liquidus olivine and the estimated mantle potential temperature reflect indeed this difference. Comparing the calculated mantle potential temperature with the ambient asthenosphere temperature provided the same model, we have not got excess temperature for the Ság and Uzsa mantle, whereas the mantle source beneath Pauliberg could have a 100°C positive thermal anomaly. Nevertheless, this anomaly is less than that characterized by plume areas. Our results indicate that hot mantle plume beneath the Pannonian Basin is unlikely. The excess temperature beneath the western margin of the Pannonian Basin can be readily explained by the geodynamic model provided by HARANGI & LENKEY (2007), i.e. a thin-spot suction beneath the Pannonian Basin that enhanced a mantle flow below the Alpine region, where the lithosphere is significantly thicker. The mantle flow beneath the western margin of the Pannonian basin, characterized by large lithosphere-asthenosphere boundary gradient, could lead to decompression melting at various depths.

HARANGI, Sz. & LENKEY, L. (2007): Geological Society of America Special Paper, **418**: 67-92.

PUTIRKA, K.D., PERFIT, M., RYERSON, F.J. & JACKSON, M.G. (2007): Chemical Geology, **241**: 177-206.

**Hochauflösende Kartierung quartärer Störungen im  
südlichen Wr Becken**

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Die genaue Lokalisierung von Störungsverläufen in Sedimentbecken ist stark von der Datenquelle abhängig. Tiefliegende Strukturen werden im Allgemeinen mit 2 oder 3 D Seismik abgebildet, durch die aber die Abbildung oberflächennaher Störungen oder Strukturen nicht gegeben ist. Störungssysteme in Pleistozänbecken sind oft nicht bekannt, da flächendeckende Untersuchungen selten sind. Der Einsatz von Geoelektrik oder Ground Penetrating Radar (GPR) ist für solche Zwecke nur bedingt geeignet, da eine Determination von Störungen aufgrund des fehlenden Kontrastes nicht möglich ist, oder die Interpolation in ein räumliches Bild schwierig ist. In dieser Studie wurden vorhandene Gravimetriedaten (Bouguer Schwere) des südlichen Wiener Beckens, die vor allem für Kohlenwasserstoff Untersuchungen (OMV) engmaschig (bis max. 300 m) und großflächig verwendet worden sind, auf ihre hochfrequenten Anteile gefiltert, um sie auf ihre Verwendbarkeit zur Identifikation oberflächennaher Strukturen zu prüfen. Die Hochpass-Filterung wurde in erster Linie über Gradientenrechnungen durchgeführt (Horizontal- und Vertikalgradient). Durch die Verfügbarkeit von mehr als 1200 seichten Bohrungen, geoelektrischen Messungen, 2 D und 3 D Seismik, sowie Aufschluss- und Oberflächeninformationen konnten die gravimetrischen Signale sehr gut auf ihre (neo-)tektonische Aussagekraft überprüft werden. Deutliche Lithologie- und Dichteunterschiede zwischen neogener, mariner und konsolidierter Sedimente sowie pleistozäner, fluvialer, oft lockerer Beckenfüllung waren für die Feststellung der Geometrie und Struktur des Pleistozänbeckens und der Evaluierung der Resultate der Gravimetrie sehr hilfreich. Die Ergebnisse zeigen, dass Hochpassfilter Störungsmuster abbilden, die sehr exakt mit denen zusammenpassen, die aus 2-

dimensionalen Datenquellen abgeleitet wurden. Weiters konnte gezeigt werden, dass viele geomorphologische Strukturen mit gravimetrischen relevanten Dichteänderungen assoziiert sind, und damit auch ein eindeutiger Beweis für ihren tektonischen Ursprung erbracht werden kann. Daten aus Bougueranomalien haben damit zur wesentlichen Verbesserung des Verständnisses der pleistozänen Geschichte beigetragen. Die vorhandenen Gravimetriemesswerte, die insbesondere in verschiedenen Sedimentbecken großflächig und mit hoher Auflösung verfügbar sind, können damit als wichtige Quelle zur hochauflösenden Strukturaufnahme dienen.

### The unique style of biocalcification by *Oocardium stratum* (Desmidiaceae, Chlorophyta)

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In the Eastern Alps, spring-associated limestones (SAL) are present as flowstones and porous limestones (tufa limestones). Among actively-forming tufas, formation of limestones with a cream to ocre-coloured, smooth to botryoidal surface is induced by the unicellular micro-alga *Oocardium stratum*. Calcification by *O. stratum* can comprise a major portion of large SAL deposits. Individual cells are heart-shaped globuli each embedded in a mucus capsule. Along part of the mucus capsule, calcification is induced in form of a tube-shaped calcite crystal. During calcite precipitation, the cells shift upward. When the cells split, their corresponding tube branches, too, while the optical orientation of the crystal lattice is retained. In this way 'bush-shaped' elongate single calcite crystals riddled by tubes (left behind by the upward-shifting algae) originate. A different calcification is represented by hemispheres with laterally-merged calcite tubes; it is as yet unknown to what extent the variations in calcification are related to environment (e. g. water chemistry, hydrology, illumination, crystallization substrate) or to genetic differences within '*O. stratum*'. Experiments with precipitation substrates indicate that calcification by *O. stratum* can proceed rapidly: the determined maximum rate of calcification (starting from colonization) is up to 10 mm per eight months. During the cold/low-lit season calcification ceases, and the cells pass into an unknown state (anabiosis?, encystation?). Over the cold season, diatom mats spread and show precipitation of calcite rhombohedra within their mucus. In the next warm season, diatom mats disappear, and *O. stratum* regenerates from unknown sources (re-activated cysts?, spores?). The calcification by *O. stratum* is unique in that spheroidal unicells produce tube-shaped, gently curved, single calcite crystals up to 10 mm in documented length. *Oocardium* calcite can comprise a macrofacies of laminated tufa in itself, or may build the 'limestone component' of phytoclastic tufas and moss tufas. In diagenetically matured SAL the original fabric of *Oocardium* calcite tends to be blurred by recrystallization combined with further, inorganic crystallization of calcite spar, leaving a coarsely-crystalline sparstone ('combispar') with patchy relicts of the original fabric. We suspect that microfacies produced by *O. stratum* are often confused with calcification fabrics from filamentous cyanobacteria, which latter are more easy to recognize in the field and in many cases are present in the same creek together with *O. stratum*.

### Modern molluscan drilling frequencies in the Gulf of Trieste

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Several hypotheses have been suggested to explain the transition from Paleozoic faunas dominated by epibenthic suspension-feeders to post-Paleozoic faunas dominated by endobenthic animals. The Northern Adriatic Sea has been used as a modern analogue for epeiric Paleozoic shelf environments because in its eastern and northernmost parts it supports dense communities of epibenthic suspension feeders (mostly sponges, ascidians and ophiurids) - a faunal structure characteristic of the Paleozoic rather than the Recent based on the life-modes of its constituent taxa. For this reason the Northern Adriatic Sea has been used to explore this long-term faunal transition. Low predation and bioturbation intensities are considered background conditions in the Northern Adriatic, but few studies have analysed drilling predation in this area. In this study we examine drilling predation on molluscs as a test of the low-predation hypothesis.

Standardized bulk samples were collected from the upper-most 20cm of sediment at two tidal flat- and six sublittoral locations. The species composition is relatively diverse (172 species of bivalves, gastropods and scaphopods from the subtidal and 67 from the intertidal, totalling 178), is typical for Mediterranean Seas and is taxonomically similar between samples. A total of 60,480 disarticulated valves and gastropod shells, and 700 articulated bivalves were examined for drill holes. The overall drill frequency across subtidal samples was 27.5%, and across intertidal samples was 1.93%. Overall drilling frequency for individual subtidal samples ranged from 18.7% to 32.4% and for intertidal samples from 1.4% to 2.4%. Three species, *Bittium latreillii*, *B. reticulatum* and *Corbula gibba* were abundant in the intertidal and subtidal. For each, drilling intensities were higher in the subtidal [*B. latreillii* (n = 4353, DF = 34.5%), *B. reticulatum* (n = 2296, DF = 32.9%), *Corbula gibba* (n = 1877, DF = 33.4%)] than in the intertidal [*B. latreillii* (n = 1066, DF = 3.4%), *B. reticulatum* (n = 3517, DF = 2.67%), *Corbula gibba* (n = 1948, DF = 0.0%)]. Other abundant subtidal taxa include *Nassarius cf. pygmaeus* (n = 2387, DF = 14.1%) and *Turritella communis* (n=2209, DF = 44.1%); both confirm high drilling frequencies in the subtidal. In addition, *C. gibba*'s prey effectiveness - reflecting this species' ability to resist drilling predators in the subtidal - is high (PE = 48.5%). In summary, our results suggest that drilling frequencies are low in the intertidal, but high in the subtidal; therefore we cannot support low predation intensity as a general background condition in the Northern Adriatic Sea.

### Predatory drilling intensities of Karpatian and Badenian molluscan assemblages from the Central Paratethys

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Predation may be one of the most important agents of natural selection and therefore may contribute greatly to regional and global biodiversity. Direct evidence of ecological interactions between fossil organisms is generally rare, but one exception is predatory drill holes on molluscan shells. To date little is known about ecological interactions between molluscs and their shell-