in the West Pacific and South-East Asia, depressions close to the mid-ocean ridges and a weak elevation in the East Pacific.

Our model confirms the large-scale pattern of the dynamic surface topography proposed on the basis of bathymetric data and lithospheric cooling models. The amplitudes of the predicted dynamic topography are reasonably small and the distribution of the main topographic extremes is basically opposite to the observation. This suggests that the circulation in the mantle is partially layered and the whole-mantle flowmodels should be rejected. The lithospheric plates are an important ingredient to include in the mantle flow modeling. They can produce a significant large-scale flow influencing both the dynamic topography and the stress distribution in the lithosphere.

Acknowledgements

This research was supported by the Czech national grant (GAČR) no 205/02/1306.

References

ČADEK O. and FLEITOUT L., 1999. A geoid model with imposed plate velocities and partial layering. *J. Geophys. Res.*, 104: 29055-29075.

ČADEK O. and FLEITOUT L., 2003. Effect of lateral viscosity variations in the top 300 km on the geoid and dynamic topography. *Geophys. J. Int.*, 152: 566-580.

COLIN P. and FLEITOUT L., 1990. Topography of the oceanic floor: thermal evolution of the lithosphere and interaction of deep mantle heterogeneities with the lithosphere. *Geophys. Res. Lett.*, 17: 1961-1964.

LE STUNFF Y. and RICARD Y., 1995. Topography and geoid due to lithospheric mass anomalies. *Geophys. J. Int*, 122: 982-990.

PANASYUK S.V. and HAGER B.H., 2000. Models of isostatic and dynamic topography, geoid anomalies and their uncertainties. *J. Geophys. Res.*, 105: 28199-28209.

EMTESZ – First Electromagnetic Probing of the Trans-European Suture Zone

Václav ČERV[1], Josef PEK[1], Maxim SMIRNOV[2], Tomasz ERNST[3], Vladimir SEMENOV[3] and Krzysztof NOWOZYNSKI[3]

[1] *Geophysical Institute AS CR, 141 31 Praha, Czech Republic*
[2] *Uppsala University, 752 36 Uppsala, Sweden*
[3] *Institute of Geophysics PAS, 01-452 Warszawa, Poland*

The Trans-European Suture Zone (TESZ) divides the European continent into the Phanerozoic part in the west and Proterozoic part in the east. The EMTESZ project is directed towards a magnetotelluric study of this zone along several profiles preferentially coinciding with recently studied refraction seismic lines in Poland. The study aims at inferring the main features of the resistivity structure of the lithosphere–asthenosphere system by using modern broad-band magnetotelluric array measurements. We present results of pilot measurements carried out in 2001 and 2002 in the northwestern part of the TESZ in Pomerania. We focus on the quality of earth response functions with respect to man-made noise which may create considerable problems to MT soundings in Poland. Several long-period magnetotelluric measurements together with magnetovariational responses from the Belsk observatory give us a possibility to estimate the regional geoelectrical structure of the upper part of the mantle. These measurements show that, at the depth of about 8–25 km, a layer with an apparent anisotropy can be formally interpreted with the resistivity of about 6 Ohm-m along the TESZ and about 300 Ohm-m in the orthogonal direction, which correlates with the seismic zone of relatively low velocities. A preliminary model of the geoelectric structure of the crust across the TESZ is presented.

Detrital Cr-spinels in Culm Sediments and their Tectonic Significance

Renata ČOPJAKOVÁ and Petr SULOVSKÝ
Institute of Geological Sciences, Masaryk University, Kotlářská 2, 611 37 Brno, Czech Republic

Detrital Cr-spinel is an important component of heavy mineral assemblages. The chemical composition of spinel grains provides specific information about the source rocks types in different tectonic settings. Cr-spinel $(Mg, Fe^{2+})(Cr, Al, Fe^{3+})O_4$ is a ubiquitous accessory mineral in basalts and peridotites. Spinel composition reflects magma chemistry, the degree of partial melting and fractional crystallization (Cr and Mg partitioning into the solid, Al partitioning into the melt), temperature, fO_2 (ratio of Fe^{2+} to Fe^{3+}) (Yong, 1999). The Mg# in volcanic spinels reflects the cooling rate.

Detrital Cr-spinels were found in the heavy mineral assemblages of greywackes from the Drahany Culm. Spinel grains show significant variations in most important compositional parameters such as Mg# $(Mg/Mg+Fe^{2+})$, Cr# $(Cr/Cr+Al)$, TiO_2 and Fe^{2+}/Fe^{3+}. These variations suggest multiple sources for spinel grains.

Detrital Cr-spinels are mostly homogenous with the exception of some grains from the Myslejovice Formation that show typical features of spinels from metamorphic rocks. These spinels are partially replaced by Cr-chlorite and/or Cr-hornblende, have increased contents of ZnO (3–6 wt %), very low Mg# and high Cr#. These spinels are typically present in Moldanubian metamorphic rocks such as serpentinites.

TiO_2 content in conjuction with the Fe^{2+}/Fe^{3+} ratio (Lenaz and Kamenetsky, 2000) were used as criteria to distinguish between volcanic and peridotitic spinel. The population in the Protivanov Formation is dominated by high-TiO_2 and low-Fe^{2+}/Fe^{3+} volcanic spinel. The proportion of volcanic spinel decreases toward the younger part of Culm sediments. This trend corresponds very well to the decreasing amount of volcanic pebbles in conglomerates from older to younger Culm sediments. Three types of volcanic spinels were distinguished using the classification diagrams of Kepezhinskas et al. (1993) and Kamenetsky et al. (2001). High Al_2O_3 (> 25 wt %) with Mg# 0.5–0.7 and Cr# 0.3–0.5 compositions plot well within the field of MORB or MORB-type back-arc spinels. Spinels with 16–23 wt % Al_2O_3, <1 wt % TiO_2, Cr# 0.5–0.7 and Mg# 0.3–0.7 may be derived from subduction-related back-arc basalts or continental tholeiites. One spinel grain with high TiO_2 (1.5 wt %) fitted well into the field of spinels from ocean island basalts.

The proportion of peridotite spinel with low TiO_2 and high Fe^{2+}/Fe^{3+} ratio increases toward the younger part of Culm sediments. A large portion of grains of peridotitic Cr-spinel yielded Cr# of 0.4–0.55 and Mg# 0.5–0.62. A comparison with the data on spinels from ultramafic rocks (Barnes and Roeder, 2001) indicates that the compositional range of the detrital spinels closely matches that of spinels from ocean-floor peridotites with affinity to Al-poorer harzburgites.

Tomášková and Přichystal (1995) suggested that the source region for volcanic and magmatic pebbles was an island arc, denuded in the Lower Carboniferous. Our study of detrital spinels and their tectonic settings does not confirm that the material came from an island arc.

This research was supported by the Grant Agency of the Czech Republic (grant project No. 205/99/0567) and by the FRVŠ of the Czech Republic (grant project No. 576/2003).

References

BARNES S.J. and ROEDER P.L., 2001. The range of spinel compositions in terrestrial mafic and ultramafic rocks. *J. Petrol.*, 42: 2279-2302.

KAMENETSKY V.S., CRAWFORD A.J. and MEFFRE S., 2001. Factors controlling chemistry of magmatic spinel: an empirical study of associated olivine, Cr-spinel and melt inclusions from primitive rocks. *J. Petrol.*, 42: 655-671.

KEPEZHINSKAS P.K., TAYLOR R.N. and TANAKA H., 1993. Geochemistry of plutonic spinels from the North Kamchatka Arc – Comparisons with spinels from other tectonic settings. *Mineral. Mag*., 57, 389: 575-590.

LENAZ D. and KAMENETSKY V.S., 2000. Melt inclusions in detrital spinel from the SE Alps (Italy–Slovenia): a new approach to provenance studies of sedimentary basins. *Contrib. Mineral. Petrol.*, 139: 748-758.

TOMÁŠKOVÁ A. and PŘICHYSTAL A., 1995. Valouny vulkanitů z kulmských slepenců: pravděpodobná geotektonická pozice a možné zdrojové oblasti vulkanitů. *Geol. Výzk. Mor. Slez. v R. 1994*: 75-77.

YONG I.L., 1999. Geotectonic significance of detrital chromian spinel: a review. *Geosci. J.*, 3, 1: 23-29.

Fluid Inclusion Planes vs. Fracturing in PTP-3 Borehole at Podlesí Granite Stock (Krušné hory Mts., Czech Republic)

Petr DOBEŠ[1], Gyula MAROS[2], Klára PALOTÁS[2], Balázs KOROKNAI[2] and Eniko SALLAY[2]

[1] *Czech Geological Survey, Klárov 3, 118 21 Praha 1, Czech Republic*

[2] *Geological Institute of Hungary, 1143-Budapest, Stefánia út 14, Hungary*

Czech Geological Survey in cooperation with other organizations dealed with the project of geochemical interaction between fluids and fractured rock environment in period from 2000 to 2002 (VaV/630/3/00). For this purpose two drillholes, PTP-3 and PTP-4A, were drilled in close vicinity of 10 m to a depth of 300 m in the granitic body of the Podlesí granite stock. This contribution shortly comprises the results of core scanning with microscopic observation of fluid inclusion planes.

The Podlesí granite stock is located in the western part of the Krušné hory Mts. in western Bohemia and represents the most fractionated part of the late Variscan Nejdek-Eibenstock pluton (Breiter 2002). The stock was emplaced into Ordovician phyllite and biotite granite of "younger intrusive complex". The Podlesí granite body consists mainly of albite-protolithionite-topaz granite (stock granite). In the uppermost part, the stock granite is penetrated with several flat-lying dykes of albite-zinnwaldite-topaz granite (dyke granite). Biotite granite was found only in boreholes. The stock is crosscut by steep quartz-rich veinlets accompanied by greisenisation and tourmalinisation of the surrounding rocks.

Táborská and Breiter (1998) measured magnetic anisotropy of stock and dyke granite from outcrops. The magnetic fabric reflected a primary fabric produced during magmatic emplacement. The rocks were not affected by later deformations. Steep foliation and very steep lineation probably indicate fabric formed during the ascent of magma.

The borehole PTP-3 was measured with acoustic borehole televiewer and the core was scanned with the ImaGeo mobile corescanner (Maros et al. 2002). Combining these two methods offered the oriented distribution of the different geological