Metamorphic evolution of the Wadi Feiran-Solaf Core Complex, Sinai, Egypt

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The Wadi Feiran-Solaf belt lies in the northwestern part of the exposed hard rocks of Sinai Peninsula, Egypt, which is the northern segment of the Arabian-Nubian shield. This shield and the entire East African Orogeny were assembled during the Neoproterozoic and now constitute a pile of thin skinned Pan African low grade nappes overlying a high grade metamorphic basement. This basement is exposed in a series of windows in the Eastern Desert of Egypt, where they have been interpreted as metamorphic core complexes. The Wadi Feiran-Solaf belt is one of several metamorphic belts in Sinai and was metamorphosed at upper-amphibolite facies and locally to granulite facies conditions. In this project we study if this belt can also be interpreted as a core complex and if it is related to those known in the Eastern Desert. These rocks of the Feiran-Solf belt are arranged in form of two doubly plunging overturned antiforms, which are separated by a synform and high angle thrust fault. In the eastern and western margins of this core complex, the granitoids intruded along pre-existing structural features. These structural features are northwest trending sinistral strike-slip faults, while the southern margin of the core was identified by granitic intrusions intruded perpendicular to the main metamorphic foliations and along normal faults. There are three regional foliations (S_1, S_2 and S_3), defined mainly by low-pressure - high-temperature metamorphic phases. Five phases of deformation are identified in the Feiran-Solaf core complex. D_1 and D_2 are interpreted to be related to the arc-arc accretions and the closing of Mozambique Ocean. D_3 and D_4 are related to the escape tectonics exhuming the complex. The D_5 characterizes by brittle structural features. The absence of the ortho-pyroxene and the present of the liquid phase indicate that the peak assemblage is below the ortho-pyroxene-in reactions and above the liquid-in reactions at about 700-750°C and 4-7 kbar. The selected samples show nearly isothermal decompression path close to the solidus, following the maximum pressure until pressure (4.5 kbar). At lower pressure the P-T path becomes as isobaric cooling path.

Native polycyclic aromatic hydrocarbons (PAHs) in hard coals

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A variety of environmental polycyclic aromatic hydrocarbons (PAH) sources have been reported in the literature, however, unburnt coal is rarely considered.
Hard coals can carry diagenetic PAH concentrations up to hundreds, in some cases thousands of mg/kg (Willsch & Radke 1995). Hard coal is a mass product and has been mined as an energy source on a global scale for centuries. Worldwide hard coal production has increased from less than 1 to 4.96 billon tons from 1900 to 2005 (Thielemann et al. 2007). Unburnt coal particles can be released by open pit mining, spills during coal loading, and transport or accidents, or erosion of naturally outcropping seams into freshwater or marine systems (French 1998, Pies et al. 2007). On industrial sites, coal is stored on stockpiles for the production of coke, gas or steam and is subject to erosion. Apart from coke and coal tar, the particles occur at manufactured gas plant sites (Stout & Wasielewski 2004).
Physical effects of coal particles on organisms have been studied, however, the function of chemical constituents as environmental pollutants (Ahrens & Morrisey 2005, Yang et al. 2008) has hardly ever been in focus. Not much is known about the forensic characterization of coal in sediments.
Our study focuses on understanding the function of hard coal particles in soils and sediments in an environmental context. The objectives of the investigations are 1. environmental forensic characterization of international hard coals, 2. identification of often occurring toxic PAHs depending on origin and rank of the coal and 3. clarification of their bioavailability. First results of the analysis of 50 international hard coal samples show EPA-PAH concentrations mostly in the range of 50-100 mg/kg but some up to about 300 mg/kg. Total PAH concentrations are often in the range of a few hundreds of mg/kg. For the first time, dibenzopyrenes were detected in coals. Results of the current study will be presented.

Ahrens, M. J. & Morrisey, D. J. (2005): Oceanogr. Mar. Biol. An annual Review, **43**: 69-122.
French, P. W. (1998): Environ. Pollut., **103**: 37-43.
Pies, C., Yang, Y., Hofmann, T., (2007): J. Soil. Sediment., **7**: 216-222.
Stout, S.A., Wasielewski, T.N. (2004): Environ. Forensics, **5**: 195-211.
Thielemann, T., Schmidt, S. & Gerling, C. (2007): Int. J. Coal Geol., **72**: 1-14.
Willsch, H., Radke, M. (1995): Polycyc. Aromat. Comp. **7**: 231-251.
Yang, Y., Pies, C., Hofmann, T. & Grathwohl, P. (2008): Environ. Pollut., in press, corrected proof (available online).

Magnetotelluric measurements at the eastern border of the Alps (Styria and Burgenland)

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In year 2005, 10 magnetotelluric measurements were performed along an about N-S striking line between Güssing and Kobersdorf (Bgld). Another 33 soundings were carried out in 2006 along a more or less SE-NW line, from Güssing to Gaming, along the seismic profile CEL-07, in the continuation of the Hungarian part of the profile, where MT measurements were carried out in 2003. The aim of the measurements was to supplement deep seismic experiments, carried out at the same and adjacent areas (e.g. Guterch et al. 2003).
The preliminary results about Austria have been reported by Novak et al. (2007) and Adam et al. (2008). Along the SE-NW line, MT instruments of GFZ Potsdam, equipped with induction coils, were used, which allowed a broadband registration in the frequency range of 0.001Hz to 1000Hz. However good and reliable results are above 0.01Hz and make the investigation of the subsurface possible down to a depth of about 20km. Along the N-S line induction coils, fluxgate and torsion drift magnetometers were used. (The latter are long period instruments that can be used to investigate down to the mantle.) In the alpine region of the SE-NW profile the magnetotelluric signal was disturbed by very intense artificial noise. In order to make remote correlation