of 0.25mm/a. After this period of rapid faulting the near surface geothermal gradient is increased dramatically (>50°C/km). In order to investigate the theoretically possible surface heat flux a parameter map was calculated showing the surface heat flux in the hanging wall at a distance of 0-90km to the fault trace. This plot shows that within 10km to the fault trace the surface heat flux is increased distinclty for all faulting angles and faulting velocities. For high angled normal faults the lateral cooling effect considered in the two-dimensional model is too large and the surface heat flux near the fault trace is about 0.050W/m² less. An interesting feature is that low angled faults influence the surface heat flux in the hanging wall >100km distance to the fault trace, whereas the influence on the near surface thermal structure during high angled normal faulting is considerably reduced (<50km).

The presented model shows that rapid relative displacement during normal faulting produces a warming of the adjacent hanging wall and consequently an increased surface heat flow. This effect can easily provide the heat necessary for the resetting of the FT ages in the hanging wall of the Rechnitz Window without the assumption of a hidden volcanic body.

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Gondwana origin of the Tisza-Dacia Unit? Arguments from paleomagnetism

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The origin of the crustal units today forming the Intra-Carpathian area is still under debate (CSONTOS 1995). The so called Tisza -Dacia unit is built up by the Apuseni Mts., the South and the East Carpathians and is characterized by a common Tertiary tectonic evolution. The pre-Tertiary tectonic history of these blocks is hardly known. Middle Jurassic to Lower Cretaceous sediments from Piatra Craiului and Bucegi Mts. (SE Carpathians, Romania) were sampled for a paleomagnetic study. The sites are situated in the massifs of Piatra Craiului and Bucegi and in the strongly faulted area between them.

The Jurassic sediments lie on pre-alpine polymetamorphic crystalline basement of the Leaota massif which is part of the alpine Bukovinian nappe system. Facies development (fining up) and synsedimentary tectonics (normal faults) point to a scenario of extension tectonics presumably lasting from Middle Jurassic to Early Cretaceous.

At present we are able to isolate a common component for all sites with identical inclinations (≈ 62°) and declinations ranging from 20° to 160°. The scatter of the mean declinations are interpreted as the result of differential clockwise rotations.

In the Bucegi massif the common component (D 122°/I 62°) is better grouped in geographic than in stratigraphic co-ordinates pointing to a post-tectonic remagnetization. The steep inclination (actual geomagnetic field inclination ≈ 64°) indicates a remagnetization event which took place just before the Early Miocene large scale rotations.

Jurassic limestones reveal shallow reverse inclinations (≈ -30°) at high demagnetization temperatures additionally.

Clockwise rotations of the Apuseni Mts. and the South and East Carpathians (Tisza-Dacia unit) were already described by BAZHENOV et al. (1993) and PATRASCU et al. (1990,1994). Their investigations of Middle to Upper Cretaceous and Tertiary sedimentary and volcanic rocks reveal rotations of more than 80° and a timing of this movements prior to the Middle Miocene. PATRASCU et al. (1990) were able to give a well defined Upper Cretaceous (70-80 Ma) paleolatitude for the Apuseni Mts. of 21° N. The shallow reverse inclination from the Jurassic limestones corresponds to a paleolatitude of about 16°. Both the Cretaceous and the Jurassic paleolatitude are a convincing argument for the Gondwana origin of the Tisza-Dacia unit.

The ongoing project focuses on the detection of primary magnetic remanences of Middle Jurassic to Early Cretaceous age in the SE-Carpathians. The reconstruction of the plate tectonic puzzle in the Carpathian realm will greatly benefit from further paleomagnetic research.

Neogene magmatism at the Alpine-Pannonian transition zone

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Neogene alkaline volcanism developed in two main stages and formed two volcanic fields (Styrian Volcanic Field, SVF and Little Hungarian Plain Volcanic Field, LHPVF) at the Alpine-Pannonian transition zone. In the SVF, a Karpatian/Early Badenian trachyandesitic-latitic volcanism was followed by a Late Pliocene alkaline basaltic one, whereas in the LHPVF a Sarmatian/Early Pannonian bimodal trachyte-basalt magmatism preceded a Pliocene alkaline basaltic volcanic activity. This presentation focuses mainly on the LHPVF.

The Sarmatian trachytes have clear intraplate affinities and differ from the SVF trachyandesites and latites. The Early Pannonian basalts generated in the asthenosphere and show a remarkable similarity to the basalts of Oberpullendorf and Pauliberg (western LHPVF). Sr and Nd isotopic ratios of these volcanic products reflect more depleted character than the Pliocene alkali basalts of the central Pannonian Basin. Early Pliocene mafic volcanics of the southern LHPVF have dominantly primitive composition and show a wide variability in chemistry. Trace element and Sr and Nd isotopic signatures reflect different degrees of partial melting and a heterogeneous mantle source for the southern LHPVF magmas. Partial melting could have occurred either in the garnet stability field or in the garnet-spinel transition zone. A two-component mixing model is suggested for the generation of the LHPVF mafic volcanics. One of these components might be located in the asthenosphere or in the TBL (Thermal Boundary Layer) and has some features of St Helena-type mantle. The other component might be located at the lower part of the MBL (Mechanical Boundary Layer) and is considered to be the result of aqueous fluid metasomatism related to the Miocene subduction along the Carpathian arc.

Alkaline volcanism in the LHPVF postdated the main extensional phase of the Little Hungarian Plain and is supported predominantly by asthenosphere-derived melts. The trachytic volcanism occurred at the centre of the basin during the short-term aborted narrow-rift stage when β could have exceeded 2. The post-extensional basaltic volcanism might be related to the moderate raise of the mantle potential temperature due to an influence of a mantle plume ('thinspot' effect?).

Although geochemistry of the Badenian SVF latites shows some subduction influence, it cannot be stated that they have a direct subduction-related origin. Moreover, a recent study has pointed out a strong genetical relationship between the Gleichenberg latite and the ultrapotassic rocks of Balatonmária (central Pannonian Basin). They could be generated in a syn-rift phase when lithospheric extension reactivated K-rich metasomatic veins in the lower part of the MBL and caused decompressional partial melting.

Remote sensing, structural geology and 3D-seismic: an integrated approach to explore tectonic structures in the Vienna Basin

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Tectonic interpretations in the Vienna Basin and, likewise, in other prospective and hydrocarbon bearing sedimentary basins are substancially hindered by the very limited outcrop conditions in basin areas. The correct evaluation of the structural geometry and evolution of such basins, however, is of crucial importance for hydrocarbon exploration and production, e.g., for assessing reservoir geometries, for reconstructing fluid pathways through active or abandoned faults, and for evaluating the sealing capacity of faults. With kind permission, technical and finacial support of OMV, a detailled R&D study is carried out in the Vienna Basin and its surrounding which integrates the interpretation of multitemporal and multisensoral satellite imagery, 3D-seismic data, and structural geology.

Remote sensing interpretations use images of sensors showing different imaging geometries and spatial resolutions to rule out effects inherent in satellite data which lead to a suppression of lineaments parallel to the sensor look direction. Additionally to data of line scanners, mapping the visible and infrared electromagnetic spectrum (SPOT-Panchromatic, LANDSAT Thematic Mapper), Synthetic Aperture Radar Data (SAR) operating in the microwave range (ERS-1, Japanese ERS-1) are interpreted. Due to the high sensitivity of microwaves to surface roughness and soil moisture and their capability to penetrate the surface to a certain extent, they proved to be a useful tool for the mapping of morphology and lineaments. The data sets are geocoded using a digital elevation model (DEM) with a grid spacing of 50 meters to enable the overlay and the synoptic interpretation of the different data sets (sensor merge) and to correct for terrain induced geometric distortions (e.g., foreshortening and layover in radar scenes which hinder the thematic interpretation). DEM is also used to create perspective views to facilitate the extraction of lineaments. After the execution of atmospheric coretions in the case of Landsat TM and the suppression of the speckle noise in the radar scenes by the application of additive filters (e.g., Frost filter), different directional filter kernels have been used to enhance the edges in the scenes. A