Geophysical Research Abstracts,
Vol. 10, EGU2008-A-11859, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-11859
EGU General Assembly 2008

Stress field evolution during the inversion of the southern margin of the Central European Basin System (CEBS)

J. Sippel (1), M. Scheck-Wenderoth (1), K. Reicherter (2), S. Mazur (3)

(1) GeoForschungsZentrum Potsdam (GFZ), Potsdam, Germany, (2) RWTH Aachen, Aachen, Germany, (3) GETECH, Leeds, UK, (sippel@gfz-potsdam.de / Fax: +49-331-2881349 / Phone: +49-331-2881342)

We perform a fault-slip analysis based on more than 700 mesoscale striated faults sampled along the inverted southern margin of the CEBS. For each fault-slip pattern sampled at more than 30 sites we derive the corresponding stress state(s) in terms of the reduced stress tensor consisting of (1) the orientations of the three principal stress axes σ_1, σ_2 and σ_3 with $\sigma_1 \geq \sigma_2 \geq \sigma_3$ and (2) the ratio of principal stress differences, R=$(\sigma_2 - \sigma_3)/(\sigma_1 - \sigma_3)$ with $0 \leq R \leq 1$.

Despite the different ages of investigated rocks (Late Carboniferous, Middle Triassic, Late Jurassic, and Late Cretaceous), we find very consistent stress configurations throughout the entire area which can mainly be combined to a reduced number of stress fields which affected the area either in parts or entirely since Late Cretaceous times when the far-field compressional stresses of the Alpine orogeny started to affect the area.

The most prevalent paleostress field is characterised by a horizontal NNE-SSW- to NE-SW-directed maximum principal stress axis (σ_1) and relatively low stress ratios (mainly $R \leq 0.3$). A less widespread stress state is associated with a horizontal NW-SE-directed σ_1-axis and more moderate stress ratios ($0.3 \leq R \leq 0.6$). Our results raise a number of questions. Are the locally observed permutations of principal stress axes related to the different stages of a single seismic cycle? Or are heterogeneities and anisotropies major causes for the stress permutations? We present the distribution and

local variations of the detected stress states and discuss possible constraints on their relative chronology.