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Paleostress evolution along the inverted southern margin of the Central European Basin System (CEBS)

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Our study is based on more than 700 mesoscale striated faults sampled along the inverted southern margin of the CEBS where Upper Carboniferous volcanics and Middle Triassic, Late Jurassic, and Late Cretaceous limestones crop out. For each fault-slip pattern sampled at more than 30 sites we derive the corresponding stress state(s) given by 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 $0 \leq R \leq 1$. Many sites display a heterogeneous fault population originating from successive deformation phases. We overcome the problem of distinguishing different stress states from such data sets by combining the concepts of the "P-B-T-Method" (Turner, 1953, after a solution of Sperner et al., 1993) and the "Multiple Inverse Method" (Yamaji, 2000) as described by Sippel et al. (accepted).

Despite the different ages of investigated rocks, we find very consistent stress configurations throughout the entire area. This allows us to combine the results from different sites to a reduced number of stress fields which affected the area either in parts or entirely. The most prevalent paleostress of the area is characterised by a NNE-SSW- to NE-SW-directed maximum principal stress axis (σ_1) and relatively low stress ratios (mostly $R \leq 0.3$). This stress (re)activated strike-slip and reverse faults during the Late Cretaceous - Early Tertiary basin inversion induced by the far-field compressional stresses of the Alpine orogeny. We present the distribution and local variations of this prevalent stress field and relate it to some older or younger stress states, the presence

of which is limited to certain subareas.

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