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Basins of the Eger Rift (western Bohemian Massif) – control of their origin and development by structure of the mantle lithosphere

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Several basins developed in the Eger Rift (ER) that forms the easternmost branch of the European Cenozoic Rift System. The ER is located above the junction of three domains of mantle lithosphere with different fossil olivine fabrics revealed by consistent orientations of seismic anisotropy (Plomerova et al., 2007). The domains represent mantle components of the major tectonic units (micro-plates) assembled during the Variscan orogeny: Saxothuringian (ST) to the north, Teplá-Barrandian (TB) and Moldanubian (MD) to the south. Character of mantle suture/transition between the units seems to be decisive for forming three Cenozoic sedimentary basins belonging to the part of the ER that is characterized by graben morphology. The graben is located above the steep and narrow suture between the ST and TB lithospheric mantle domains, where also two deep basins - Sokolov and Most basins (over 1000m deep) developed. On the other hand, the Cheb Basin (CHB), reaching only about 300m in its deepest part, formed above the inclined suture of the complicated “triple junction” of the ST, MD, TB mantle units. The most subsided parts of the CHB developed above the centre of the mantle transition, whereas a well expressed morphology developed above the ER flanks. Our analysis of locations of the Cenozoic basins in relation to the mantle fabrics shows that it is the character of mantle sutures that controls the shape, depth and development of the basins.