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Tectonic Evolution of the Cretaceous Sava-Klepa Massif, Former Yugoslav Republic of Macedonia, based on field observations and microstructural analysis – Towards a new geodynamic Model

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The Balkan Peninsula was formed during the Mesozoic collision of Gondwana and Eurasia, associated with the closure of the Neo-Tethyan Ocean. As a result, two ophiolitic belts were formed: Dinaride–Hellenide ophiolitic belt in the southwest and the Vardar ophiolitic belt in the northeast. The bulk of Balkan ophiolites originated in the Jurassic (Robertson & Karamata, 1994), and only recently the Late Cretaceous Sava-zone ophiolites are discovered. Ophiolit-like outcrops of Mount Klepa in the Central Macedonia represents a part of Late Cretaceous oceanic lithosphere within the Sava Zone, comprising of pillow lavas, sheet flows, columns, hyaloclastites, dikes as well as cumulates. In this study we investigate the geodynamic setting and evolution of the Late Cretaceous Klepa Massif. Our working hypotheses we want to test is that Klepa Massif represents a new ocean opened through rifting after the closure of Tethyan ocean(s) and collision of Europe and Gondwana already in the Late Jurassic to Early Cretaceous. This hypothesis contradicts the accepted model suggesting that Sava ophiolites represent a relic of the Neo-Tethyan Ocean that closed in the Late Cretaceous.

During detailed structural geology field studies, the ophiolitic rock sequence of Klepa Mountain area was mapped in several profiles and about 60 rock samples were taken. These field data in addition to the north-south trending outcrops of the Klepa ophiolite and the north-south trending shear zones which bound the Klepa basalt, lead to the assumption of the existence of a pull apart basin. With the help of microstructural analyses we will determine the deformation history and temperatures which also will be confirmed by the analyses of calcite twins (Ferril et al., 2004). Quartz grain size analysis of quartz bearing rocks, were used for stress piezometry. Furthermore, quartz crystal geometry and crystallographic orientations, which were measured with the Fabric Analyser G60 (Peternell et al., 2010), reveal the deformation history, i.e. the switch from compressive to extensional, rift forming, regime.

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