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IMPACT OF MECHANICAL STRATIGRAPHY ON DEFORMATION STYLE IN THE CENTRAL EXTERNAL DINARIDES: A 2D FORWARD KINEMATIC MODELLING STUDY

UTJECAJ MEHANIČKE STRATIGRAFIJE NA DEFORMACIJSKI STIL U SREDIŠNJEM DIJELU VANJSKIH DINARIDA: STUDIJA KINEMATSKIM 2D MODELIRANJEM

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The External Dinarides fold-thrust belt formed during Mid-Eocene – Oligocene times by SW-propagating thrusting from the Internal Dinarides towards the Adriatic foreland. Although previously considered as structurally quite uniform, recent work of BALLING *et al.* (2021) reported along-strike contrasting deformation styles in two structural domains within this fold-thrust belt. The two structural domains with very contrasting deformation styles are separated by the N-S-striking dextral Split–Karlovac Fault, a 250 km long, transpressive transfer fault. The southeastern domain is characterized by a thin-skinned SW-vergent nappe stack in contrast to the northwestern domain, where a set of blind, thick-skinned top-SW thrust duplexes prevail underneath the passive NE-vergent backthrusts. To better understand possible causes that controlled these contrasting along-strike deformation styles, we firstly analysed a spatial-temporal along- and across-strike distribution of Paleo-Mesozoic lithofacies to both sides of the Split-Karlovac Fault. We further estimated the role of mechanical stratigraphy on deformation styles in this part of the fold-thrust belt. This analysis was used to construct a new 2D kinematic forward model across the northwestern backthrust-dominated domain. Our best-fit forward-modelled balanced cross section traversing the central Velebit Mtn. portrays a 75 km wide triangle zone. This zone took up at least 47 km of shortening during Eo-Oligocene times. It comprises a set of thin-skinned NE-vergent backthrusts detached in the upper Paleozoic basement atop a SW-vergent thick-skinned antiformal stack detached in the lower Paleozoic Adriatic basement. The NE-vergent backthrusts likely nucleated at lateral facies boundaries related to extensional half grabens that locally formed during Permian to Middle Triassic and Late Jurassic phases of a passive margin extension. During the Eo-Oligocene shortening, the selective inversion of inherited Mesozoic half grabens boundary faults into the NE-vergent backthrusts in the northwestern domain led to the observed along-strike changes in the deformation style of the External Dinarides. Thus, our results indicate that both the variations in the mechanical stratigraphy and the pre-orogenic structural inheritance obtained during rifting and passive margin stages exert control on Eocene–Oligocene contractional structures within the central part of the External Dinarides.

BALLING, P., TOMLJENOVIĆ, B., SCHMID, M.S., USTASZEWSKI, K. (2021): Contrasting along-strike deformational styles in the central external Dinarides assessed by balanced cross-sections: Implications for the tectonic evolution of its Paleogene flexural foreland basin system. Global and Planetary Change, 205, 1–24.