

Lateral transfer of Neogene contractional deformation in the Dinarides during the Adriatic indentation

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Orogenic collisional systems are often characterized by lateral variability of contractional deformation driven by along-strike changes in the mechanics of collision or changes in the subduction dynamics. The Miocene - Quaternary indentation of the Adriatic promontory into the Southern Alps - Dinarides system is connected along the strike with the subduction of the Ionian domain and the mantle dynamics related to the evolution of the Aegean slab. The transition from indentation in the Dinarides to the observed balance between external contraction and internal extension in the Hellenides was thought to be accommodated in the Albanides segment, while the effects in external Dinarides are little known. We have performed a kinematic study in the external Dinarides of Montenegro, Croatia and Bosnia- Herzegovina to quantify the role of post-Eocene deformation that were thought to represent the last major moment of collisional deformation. This deformation has affected the Dinarides Lake System, which is a system of endemic and isolated Miocene intra-montane basins, providing critical age constraints for the kinematic evolution. The results demonstrate that these thin Miocene basins opened in response to a generalized moment of extension observed in the entire external Dinarides, fault offsets cumulating hundreds of meters of offsets in average. This was followed by a generalized latest Miocene - Quaternary inversion that transferred the contractional deformation from the internal Dinarides in the NW to the present day continental subduction recorded in the SE external Dinarides of Montenegro. The transfer still takes place along a complex system of thick-skinned thrusts that transfer their offsets gradually to a more external position via dextral strike slip faults that reach tens of kilometers of offsets. We have documented that a significant number of previously known (e.g., Split-Karlovac lineament) and newly identified dextral faults are still active at present. In essence, the entire system transfers the contractional deformation recorded in the internal Dinarides and the Southern Alps, to the active subduction recorded in the external Dinarides of Montenegro and its continuation towards the Hellenides. These observations demonstrate for the first time a kinematic connection between the active subduction and collisional processes in the Alps and Hellenides via a large-scale transfer system in the Dinarides.