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Understanding the mechanics of post-8Ma oblique inversion in the Central Dinarides: inferences from the study of the Sarajevo-Zenica and Konjic basins

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Abstract

The overall evolution of the Dinarides orogen was characterized by a Late Jurassic - Paleogene period of orogenic build-up that has created the presently NW-SE oriented geometry of the nappe stack and was followed by an early-middle Miocene extension associated with the formation and evolution a large number of isolated intra-montane basins, known as the Dinarides Lake System. The N- to NE-wards indentation of the Adriatic continental micro-plate started In the Dinarides at $\sim$ 8 Ma and created a number of obliques structures that inverted these Miocene intra-montane basins and are often miss-interpreted to belong to the inherited nappe stack. We have studied in detail the mechanics of indentation in some of the largest Miocene basins located in the Central Dinarides of Bosnia and Herzegovina, such as the Sarajevo-Zenica and Konjic. In terms of sedimentation, the Miocene extension was associated with a basin deepening stage characterized by syn-kinematic deposition of clastic wedges in the hanging-wall of normal faults. Field data kinematics has demonstrated that the post- 8 Ma inversion was characterized by large amounts of strain partitioning distributed in such a way that NW-SE to N-S oriented dextral strike-slip faults transfer their offsets to E-W oriented thrusts, high-angle reverse faults and folds along transpressional step-overs and retraining bends. The overall transpression is partitioned along inherited large-offset normal faults and orogenic contacts, while continuation of deformation along the curved geometry of such structures resulted in limited counter-clockwise rotation around vertical axes, changing the kinematics of large offset thrusts to dextral strike-slip. The overall dextral transpressional transfer has also partitioned deformation across basins in such a way that offsets are highly variable along individual structures, although the total amount of deformation is relatively constant. The overall deformation is still presently active, as observed in seismicity and distribution of active faults. At the large scale of the Dinarides, the studied deformation is part of a larger system of N-S to NW-SE oriented dextral transpressive faults, step-overs and retraining bends that transfer their deformation from the NW internal part to the SE external part, where deformation connects with the active subduction and thrusting observed SE-ward in the Albanides and Hellenides.