



The link between tectonic and sedimentation in an asymmetric extensional basin: the late Miocene evolution of the Sarajevo-Zenica basin, Bosnia and Hercegovina

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Extensional back-arc basins develop in overriding tectonic plates during the slab retreat, as often observed for instance in the Panonian, Aegean or Western Mediterranean domains. In this type of basins, pre-existing major thrusts or nappe contacts inherited from the earlier orogenic evolution provide contrasts in rheology and localize the extensional deformation along large-scale asymmetric detachments. Their footwall exhumation is associated with the formation of asymmetric extensional basins in the hanging-wall controlled by normal faults forming half-graben geometries. In such tectonically active basins, the architecture of the sedimentary infill is controlled dominantly by the balance between pulses of tectonic subsidence along normal faults driving accommodation space and coeval moments of tectonic exhumation controlling the variations in sediment supply. In such systems, deformation migrates in space and time in the direction of the extensional transport affecting the spatial architecture of the basin infill.

One optimal place to study the interplay between tectonic and sedimentation in asymmetric extensional basins is the Dinarides orogenic area, where the back-arc extension was responsible for the creation of a large number of small-scale basins that are part of the Oligo-Miocene Dinaride lake system. The Sarajevo-Zenica basin is the largest basin in this intra-mountain system and is located near the transition between the External and Internal Dinarides. The basin formed in the hanging-wall of a large-scale top-NNE detachment associated with the exhumation of the Mid-Bosnian Schists Mountains in its footwall. The basin was filled with Upper Oligocene – Pliocene alluvial-fluvial and lacustrine sediments characterized by an endemic fossil fauna. The study of basin normal faults and associated syn-kinematic sedimentation has demonstrated that the deformation migrates SW-wards in time. This is indicated by the NE-tapering syn-kinematic wedges, the migration of main depositional units and the SW-ward back-stepping of normal faulting that gradually exhumed the Mid-Bosnian Schist Mountains footwall. Syn-kinematic sedimentological patterns coupled with structural data indicate four phases of activating the normal faults followed by coarsening-upward successions that overlies maximum flooding surfaces. The observed deformations can be explained as a result of a retreating subducting slab beneath the Dinarides.