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Geodynamics of the Sivas Basin (Turkey): from a forearc basin to a retroarc foreland basin

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Anatolia records the consumption of several oceanic basins, from the Northern Neotethys domain, by north-dipping subduction until the end of Mesozoic. The associated obduction event occurred during Campanian, from North to South and from Greece to Oman, leading to the emplacement of ophiolite thrust sheets and associated ophiolitic mélange.
In particular, the Sivas Basin in Eastern Anatolia is located at the boundary between the Kırsehir block to the East, Pontide arc to the North and Tauride Platform to the South, sutured by ophiolitic belts. The Sivas Basin formed a Tertiary fold-and-thrust belt, which exhibits mainly north verging thrust in Paleogene deposits, and South verging thrust in oligo-miocene sequence. To understand the northern verging thrust above south verging obduction, it is necessary to zoom out of the basin, and include a set of processes that affect the eastern Anatolia. This study aims to characterize the structural and sedimentary evolution of the Sivas Basin, based on a fieldwork approach, coupled to the interpretation of subsurface data, thermochronology and biostratigraphy.
The Sivas Basin was initiated in a forearc setting relatively to the subduction of the Inner-Tauride Ocean while the associated ophiolites are obducted onto the northern passive margin of the Tauride margin. Early Maastrichtian to Paleocene deposits are represented by carbonate platforms located on ophiolitic highs, passing to turbidites and olistostomes toward the North. The early Eocene sediments, mainly composed of ophiolitic clasts, are deposited on a regional unconformity marked along the southern margin of the basin by incisions in response to the emergence of north-verging thrust. The middle Eocene sediments, intensively folded by northward thrusting, are mostly represented by flysch type deposits (olistostromes, mass-flows and turbidites). The onset of the compression is related to the initiation of the Taurus shortening in a retroarc situation, in response to the north-dipping subduction of the Southern Neotethys beneath the Tauride microcontinent. The Late Eocene records a quick shallowing and the deposition of a thick evaporitic level. The Oligo-Miocene succession is characterized by fluvio-lacustrine deposition, and short lived marine transgression from the East, dated as Chattian –Aquitanian.
The post-salt evolution can be divided into three areas with different tectonic deformation styles. The western part of the Sivas Basin presents an East-West elongated trend with classical fold-and-thrust belt geometry, local salt remobilization and minor halokinesis. In contrast, the central part near Sivas, exhibits polygonal distribution of evaporates, which reveals two generations of minibasins, separated by the emplacement of a salt canopy during mid-Oligocene time. Toward the East a primary continental sequence and salt canopy conducted to the deposition of thick halokinetic Oligo-Miocene basins.
We conclude that the Sivas Basin represents a Paleogene foreland, characterized by a north verging fold-and-thrust belt, induced by retroarc shortening along the northern margin of the Tauride Platform. In contrast, the Oligo-Miocene sequence was deformed by south-verging back-thrust, above a triangular zone and passive roof detachments in evaporites.