Geophysical Research Abstracts
Vol. 16, EGU2014-12854, 2014
EGU General Assembly 2014

Late Cretaceous to recent tectonic evolution of the Ulukisla Basin (Southern Central Anatolia)

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Anatolia is located in a complex zone resulting from the collision and subduction of several continental fragments previously separated by strands of the Neotethys Ocean. Around 90 Ma ago the geology of Turkey exhibited (arguably at least) two subduction zones: one dipping below the Pontides in the North, and one dipping below oceanic lithosphere, now found as ophiolites, to the south of the Pontides. Subsequent subduction led to the accretion of (parts of) the following terranes (from N-S and old to young): the Central Anatolian Crystalline complex (85 Ma); the HP-LT Tavsanli (80-75 Ma) and Afyon (70-65 Ma) belts; and the essentially non-metamorphic Tauride fold and thrust belt (Paleocene-Eocene). In Central Turkey, continental rocks arrived earliest in the subduction zone below the ophiolites and now form the Central Anatolian Crystalline Complex (CACC). To the east, however, the continental passive margin was farther to the south and there is no evidence that continental rocks arrived in the southern subduction zone before the Late Cretaceous (∼70-65 Ma). Overlying these accretionary wedges and ophiolites are sedimentary basins, which potentially form a geological archive of the subduction and collision history of the region.

The Late Cretaceous to early Tertiary Ulukisla basin is straddling and sandwiched between the CACC in the north and the Taurides in the south. Our results show that the lower part of the infill was deposited in an E-W extensional basin expressed by large-displacement, listric normal faults. This extension direction was widespread during the late Cretaceous to Paleocene of the CACC, as shown by extensional detachments and sedimentary basins. Subsequently, the infill was folded by N-S compression, thrusted northwards by a back-thrust that cuts the south-vergent Tauride fold-thrust belt, and transported northwards. Compression likely occurred during the deposition of a sequence of continental redbeds and lacustrine sediments found in the southwestern part of the modern basin. We will show results of a preliminary paleomagnetic study that constrains the amount of rotation in the Ulukisla basin. Time constraints for different deformational phases and rotations will be provided based on field relations and absolute age dating, whereas the amount of deformation is quantified by restored regional cross sections. Integrating structural and sedimentological mapping results with a paleomagnetic and geochronological dataset will allow us to build a kinematic restoration of Central Anatolia back to the late Cretaceous.