



Paleostress maps and structural evolution of the Pontides

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In the frame of DARIUS programme we worked from 2010 to 2012 in the central and eastern Pontides. We aimed at understanding the timing and the characteristics of the extensional and compressional episodes that occurred along the southern margin of the Black Sea (Pontides belt). We used stress inversion technique (Angelier's softwares) for analyzing fault kinematics and characterizing the successive tectonic episodes in terms of paleostresses. The age of the tectonic episodes was constrained by combining structural analysis with nannoplankton dating of the sedimentary units.

1) In the central Pontides, structural analysis shows that deposition of the Barremian-Albian terrigenous sediments of the "syn-rift" Çaglayan Group was controlled by large normal faults under an ESE-WNW extension probably related to the SE-directed opening of the western Black Sea Basin. In contrast, the Coniacian-Santonian and the Paleocene "post-rift" sequences were deposited under NE-SW extension probably related to the SW-directed opening of the eastern Black Sea Basin. At the beginning of Eocene the stress regime changed from extensional to compressional which resulted in the formation of syn-compressional basins.

In order to illustrate the two-dimensional structural evolution of the central Pontides we built a NNE-trending 75 km long balanced and restored cross section between Boyabat and Sinop cities. The section is constrained by 183 sites of field data, 5 seismic lines and 8 wells. We model the Pontides as a bi-vergent structure resulting from the structural inversion of Cretaceous normal faults of the southern Black Sea margin. Apatite fission track data along this section suggest that inversion started in the earliest Eocene (~55 Ma). Eocene-Miocene shortening reached ~28 km.

2) In the eastern Pontides, an early Campanian to late Paleocene NW-SE extension was followed by three successive compressional events. A Paleocene to early Eocene NW-SE compression resulted in the formation of the main structural elements of the eastern Pontides. This compression is probably the consequence of the oblique collision of the Tauride block in the South. Paleogene sediments in the Tercan region are interpreted as remnants of a flexural basin related to this collision. A more recent NE-SW compression created interference fold structures in particular in the easternmost Pontides. It may be related to the middle Miocene collision of the Arabian plate. The last event is a N-S to NW-SE compressional to transcurrent tectonics that uplifted the Tercan foreland basin. The change from the Miocene NE-SW compression to the modern stress field is correlated with the change from shortening to escape related strike-slip tectonics that occurred in the Zagros Belt and gave way to the inception of the North Anatolian Fault Zone along the southern margin of the Pontides Belt.