Inversion and Active tectonics of Southern Margin of Black Sea Basin

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The Black Sea Basin is one of the few unexplored basins of the world and has very high hydrocarbon potential with multiple play types. Despite its high potential, less is know about its formation and evolution. There is a general consensus that the western and eastern segments of the basin opened and evolved independently since the early Cretaceous. Apart from their opening, the main concern of this study is related to the inversion and active tectonics of the southern margin of the western Black Sea basin which is constituted by the Pontides in Turkey.

Our newly acquired stratigraphical, kinematic, paleomagnetic and seismic data indicate that inversion started by the end of late Cretaceous possibly due to collision of first a magmatic arc chain located south of the Pontides within the Neotethys ocean and now embedded within the Izmir Ankara-Erzincan Suture zone. This resulted in compressional deformation and counterclockwise rotation of western and clockwise rotation of the eastern flanks of central Pontides. Inversion and thrusting reached its climax during the indentation of the Taurides in late Paleocene to Oligocene, which gave way to migration of the locus of thrusting and block rotations southwards. During this time interval, a number of foreland basin complexes were developed within and margins of the Pontides having north and south vergences in the north and the south respectively. By the late Miocene, similar to most areas in Turkey, the region experienced transcurrent tectonics with distributed deformation exerted by the collision and further convergence of the Arabian Plate along the Bitlis-Zagros Suture. This evoked reactivation of pre-existing faults and development of strike-slip faults with reverse component as in the case of onshore Balıfakı, Erikli and Ekinveren faults. Similar types of faults are also developed within the off-shore northern margin of the Pontides. The compressional deformation lasted until the emergence of the North Anatolian Fault Zone as a through going fault zone, from a wider shear zone, possibly during the Middle Pliocene. Currently the central Pontides are tectonically weakly active to inactive as indicated by seismic quiescence and recent GPS studies.