

## **The age of the Black Sea**

### **New tectonic and stratigraphic constraints from onshore Turkey**

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The precise timing of opening of the Black Sea (B.S.) Basins and its kinematics are still under debate. The Eastern B.S. Basin is often considered to have rifted in the Upper Paleocene (Robinson et al., 1995) and the Western B.S. Basin is considered to have rifted either in the Middle Cretaceous (Finetti et al., 1988; Görür, 1988) or in the Late Cretaceous (Turonian-Maastrichtian, Tüysüz, 1999). The Middle Cretaceous age is based on facies variations in the stratigraphic sequences of the Central Pontides, but no field data has been provided to relate these variations to tectonic deformation.

In the frame of the Darius Project we combine tectonic, biostratigraphic and paleomagnetic studies along the southern margin of the B.S. to understand the timing and kinematics of the openings and shortenings in the B.S. Basin. We believe that the Eocene compressional events in the Pontide belt have uplifted and partly inverted the southern margin of the B.S. Basin. Studies along the northern coast of Turkey can therefore provide information about the evolution of both the Western and the Eastern B.S. Basins.

Along the Western B.S. Basin, our field work provides the first description of Cretaceous extensional faults in the Pontides. It allows confirmation that the deposition of the “syn-rift” Çağlayan Group (Görür, 1988) was controlled by normal faults. These normal faults trend NNE-SSW and developed under WNW-ESE directed extension, consistent with the proposed directions of rifting for the Western B.S. Basin (Okay et al., 1994). These normal faults are sealed by a Late Cretaceous post-rift sequence only displaced by minor NW-SE normal faults which could be related to the opening of the Eastern B.S. Basin.

The nannofossils assemblages of 164 samples allow to accurately date these syn-rift and post-rift sequences (Hippolyte, 2010). Although the syn-rift deposits (marls of the Çağlayan Group) are Upper Barremian to Albian in age, the main subsidence took place during the Aptian-Albian. The first post-rift formation, the Kapanboğazı red pelagic limestone, which based on foraminifera was considered to be of Cenomanian-Campanian age, is found to be only Coniacian-Santonian in age based on nannofossils. These ages show that the mid-Cretaceous rifting of the Western B.S. Basin lasted very long (40 Myrs). In addition, the unconformity between the syn-rift and the post-rift sequences marks a major stratigraphic gap (uppermost Albian-Turonian). This gap and a local erosion of Çağlayan marls probably result from rift shoulder uplift as it might occur during the rifting of a thick lithosphere with large depth of necking (Spadini et al., 1996).

On top of these, the infill of syncompressional piggyback basins in the Central Pontides allows us dating the onset of compressional deformation by the Early Eocene. Our ongoing work in the Eastern Pontides is aimed at understanding the rifting of the Eastern B.S. Basin that probably occurred between these two events.