



New paleomagnetic results of Lower Cretaceous-Middle Eocene rocks from the western Pontides: Implications for the collision of the Pontides and Sakarya Zone

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A paleomagnetic study has been performed on a total of 17 sites from Lower Cretaceous limestones, Upper Cretaceous volcanic rocks, sandstones and Middle Eocene volcanic rocks in the Istanbul zone, which is the northern part of the western Pontides. The investigation area is characterized by a complex structural evolution during Cretaceous-Eocene time interval. It was accepted that this region was located to the south of the Odessa Shelf before the opening of the Western Black Sea Basin. During the Early Cretaceous, this continental fragment rifted away from Eurasia as a result of the opening of the western Black Sea basin by the northward-subducting Neotethys, and drifted southward. During the Early Eocene the northern branch of Neotethys in this area closed, which led to collision of the Istanbul Zone to the north with the Sakarya Zone to the south. Because the study area includes both Lower Cretaceous to Middle Eocene rocks which was affected by this complex tectonic events, it is therefore possible to constrain the deformation history due to our paleomagnetic results.

Stepwise thermal demagnetizations successfully isolated characteristic remanent magnetization (ChRM) directions obtained from high temperature components, carrying unblocking temperatures of 500-580°C and 600-680°C consistent with the presence of PSD magnetite (titanomagnetite) and titanohematite, respectively. However, in some cases a medium-temperature component was isolated between 400-450°C, indicating a titanomagnetite composition. Positive conglomerate tests and fold tests suggest a primary origin for the characteristic remanence in both Upper Cretaceous and Middle Eocene rocks.

Earlier studies in the investigation area show NW directed paleomagnetic declinations deduced from Upper Cretaceous volcanic rocks. According to our results it was obtained that the mean directions from Lower-Upper Cretaceous rocks show counterclockwise rotation of 20-30° relative to the reference direction of the stable Eurasia. The mean directions obtained from Middle Eocene volcanic rocks indicate no significant tectonic rotation compatible with the coeval reference direction of Eurasia. This implies that the investigation area exposed to a deformation between Lower Cretaceous to Middle Eocene as a result of the collision of the Pontides and the Sakarya Zone.