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High Resolution Magnetic Survey of the Marmaris Bay, SW Turkey

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The Marmaris Bay is a seismically active region located between the Aegean and Mediterranean Seas along the coast of the Southwest Anatolia, Turkey. Surrounded by the E-W trending Aegean grabens and the Gulf of Gökova at the west, the Burdur-Fethiye fault/shear zone at the east, the Marmaris Bay is a triangle-shaped transition zone with a 32-km of coast. Even though a few studies have been focused on the surrounding areas, there is no available geophysical data specifically pointing out the structural properties within the bay. The main scope of this study is to determine the effects of the surrounding tectonic forces on the Marmaris Bay using high-resolution magnetic data we acquired in the bay. 350 km magnetic data were recorded in summer 2015 by SeaSPY© marine magnetometer, which eliminates orientation restrictions, sensor realignment, time and temperature drift and poor absolute accuracy. This method has been particularly successful because of relatively high magnetic susceptibility contrast between the basement rocks and overlying sedimentary units, which most of the time play a masking role on the magnetic signals emanating from the underlying basement rocks.

On the basis of the total magnetic field map, two different structural properties have been revealed for the Marmaris Bay. The higher magnetic values at the western side of the bay were caused by the N-S trending compressional tectonic structures. On the other hand, the interior part of the bay has relatively low-magnetic values if compared to the western part. This must be a result of the ENE-WSW trending extensional regime which is still active.

