

Present day Evidences of Extensional Tectonics in SW Turkey Resulting from the Subduction Along the Hellenic and Cyprus Arcs

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Recently several broadband seismic stations were deployed in SW Turkey enabling us to retrieve the source parameters of the small and moderate size earthquakes taking place in the study region.

The Isparta Angle is a prominent tectonic feature in Eastern Mediterranean region lying to the north of Africa-Anatolia collision zone and to the east of Aegean extensional zone. The distinct morphological print of the eastern and western flanks namely the NW trending Ehir fault zone and NE trending Fethiye-Burdur fault zone, respectively, marks the boundaries of the angle. The low seismic activity during the last century left the Isparta Angle as a feature with little-known seismotectonics that gave rise to long lasting debates. Several researches identified the western flank as a prominent left-lateral shear zone but the normal faulting associated with the M7 1914 and M6 1971 Burdur contradicted them. Similarly, the recent M6 2000 and 2002 Sultanda earthquakes showing predominantly normal faulting mechanisms took place on the well-known Sultanda thrust fault.

Thus, the focal mechanisms of the large events on the eastern and western flanks of the Isparta Angle clearly depicts present day extensional tectonics rather than strike-slip or reverse faulting. The March 30, 2007 (ML=4.7) and April 04, 2007 (ML=4.9) earthquakes in Eirdir (Isparta) are the two recent events that shed light on the extensional tectonics acting within the Isparta angle. These two events were accompanied with more than 100 smaller earthquakes that can be classified as aftershocks or foreshocks of each other. The NNW-SSE lineament of this seismic activity is in accordance with the N-S and NNW-SSW trending tectonic features such as Kovada graben and several other normal faults occurring further southward extending toward Mediterranean seaside.

In addition, we estimated the source parameters of events around Burdur lake, Cameli basin, Mugla, Gokova bay, Menderes graben and intermediate depth events taking place in the vicinity of Antalya bay. Using these fault plane solutions we derive a regional stress tensor acting in the whole SW Anatolia region as well as some local stress tensor where we have sufficient solutions to derive statistically significant results. We observe some systematic variations in the direction of the minimum stress axis. Taking into account the locations of the minimum stress axis and the distance of these locations to the Hellenic and Cyprus arcs we suggest that some regions are influenced from the subduction of one of the arcs while some other regions are influenced from both the arcs.

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