



Properties of the 17 October 2005 earthquake seismic sequence in the Gulf of Sigacik (Seferihisar) along the Greek -Turkish borders

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In October 2005 intense seismic activity burst in the Gulf of Sigacik (district of Seferihisar) in western Anatolia. The two strongest events of the sequence both had magnitudes equal to Mw 5.8, making hard the identification of a classic mainshock, and occurred on 17 and 20 October, 2005 at 09:46 and 21:40 UTC, respectively. These events were preceded on 17 October at 05:45 by an Mw 5.4 event. The nearby Chios and Samos Islands (Greece) and the cities of Izmir and Urla (Turkey) were shaken, and most of the damage was reported in the districts of Seferihisar and Urla. The region of occurrence of these events belongs to the transition zone between two plates, of Anatolia plate in the east and of the Aegean microplate in the west and is characterized mainly by NNW - SSE extension combined with considerable strike - slip motions. Many aftershocks were recorded by the Greek and Turkish regional networks. Phase arrivals at the Greek national stations were used to relocate the events. It was evident from the distribution of aftershocks that a characteristic of the sequence was the activation of neighboring fault segments, and the occurrence of many off-fault aftershocks which made obscure the identification of the main rupture. Accurate locations from local networks are necessary to better constrain the main rupture. Based on the focal mechanisms of the two strongest events (e.g 17.10.05 Mw 5.8 NP1: strike =136; dip = 81; rake = -11; NP2: strike = 228; dip = 79; rake = -171, and 20.10.05 Mw5.8 NP1: strike =133; dip = 73; rake = -25; NP2: strike = 231; dip = 66; rake = -162) their relocated epicenters, as well as on previous knowledge of the regional tectonics, we believe that the occurrence of the two Mw 5.8 events was connected with the activation of a steeply dipping, N50E - SW trending fault, which implies dextral strike

slip motion. Using regional broad band waveforms and moment tensor inversion we computed the focal mechanisms of ~ 35 aftershocks. All events are mainly strike - slip along steeply dipping planes. Theoretical static stress changes from the strongest events give a preliminary explanation for the aftershock distribution and the triggering of seismicity.