**Seismic and Geodetic Study of the 1999 Izmit and Duzce Earthquake Sequence**

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While 1999 Mw7.4 Izmit Earthquake has been studied in detail using a variety of geologic, geodetic and seismic methods and datasets by many groups, their results prove incompatible caused by varying assumptions about crustal structure and methodology (Celvede *et al.*, 2004). We model Izmit earthquake along with Mw7.1 Duzce Earthquake using all available geodetic (InSAR, GPS, SPOT image) and seismic (strong-motions and teleseismic) data with multiple fault segments and 1-D layered structure using the method by Ji *et al.*, 2002. Models using various combinations of datasets show the sensitivity of each of these datasets to numerous features of the Izmit rupture including the issue of supershear rupture velocity and near-field ground motions. Our results show that the dip angle is shallower towards to the east of the Izmit rupture, consistent with reported dip angle from Duzce event. The slip model obtained is similar to the joint inversion of Delouis *et al.*, 2002, with three asperities, with the largest asperity to the east of the hypocenter. One difficulty in using the seismic datasets is caused by the timing issues. A comparison of broadband regional records of the event sequence displays a very weak onset (magnitude 4 or less) for the Izmit event. Thus, the trigger times at the various strong motion stations become a serious issue, which is addressed by using calibrated paths relative to Duzce earthquake, which has a strong and sharp onset. We can use these calibrations to reexamine historical events of the 20$^{th}$ century using existing teleseismic recordings by methods similar to previous studies of the 1906 San Francisco earthquake (Wald *et al.*, 1993) and 1927 Lompoc, California (Helmberger et al., 1992).

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