



The Mechanisms and Spatiotemporal Behavior of the 2011 Mw7.1 Van, Eastern Turkey Earthquake Aftershocks

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We studied the mechanisms and spatiotemporal distribution of the aftershocks of the Mw7.1 Van Earthquake, in Eastern Turkey. The 2011 Van Earthquake occurred on a E-W trending blind thrust fault in Eastern Turkey which is under N-S compression due to convergence of the Arabian plate toward the Eurasia. In this study, we relocated and studied the mechanisms of the M3.5-5.5 aftershocks from regional Pnl and surface waves using the “Cut and Paste” algorithm of Zhu and Helmberger (1996). Our results reveal that the aftershocks in the first day following the mainshock are in the vicinity of the co-seismic slip and have mostly thrust mechanism consistent with the mainshock. In the following day, a second cluster of activity at the northeast termination of the fault (North of Lake Erçek) has started. These aftershocks have approximately N-S lineation and left lateral source mechanisms. The aftershocks surrounding the mainshock rupture are deeper (>20 km) than the aftershocks triggered on the north (<15km). We also observe strike slip earthquakes on the south of the mainshock. Both of delayed activities (north of the mainshock and south of the mainshock) are consistent with the Coulomb stress increase due to slip on the mainshock. We propose that the Van Fault is truncated by two strike-slip faults at each end, which has determined the along-strike rupture extent of the 2011 mainshock.