



Co-seismic velocity change following the 2011 Van Earthquake (M7.1): Crustal response to a major event

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Monitoring the co-seismic velocity change is a major challenge, as the Earth crust has to be uniformly sampled at pre- co- and post-seismic stages using repetitive active or natural sources. Here, we investigate the crustal response to the 2011 Van earthquake using ambient noise, which provides the best-possible temporal resolution. Combined broadband recordings from regional networks are analyzed for a time period of six months framing the mainshock. We observe a co-seismic velocity decrease up to 0.76 % in the vicinity of the mainshock in the frequency range of 0.05 – 0.3 Hz. The velocity drop is largest at close proximity to the earthquake hypocenter and decreases systematically with increasing distance. We find a correlation between co-seismic velocity decrease and the amount of co-seismic slip on the rupture plane. The observed velocity drop shows the drastic response of brittle crust against a major earthquake.