

## **Study by a Physical Model of the Ahar-Varzaghan Doublet Earthquakes (6.5, 6.3) 2012 at the Northwest of Iran**

Local earthquake coda wave decay parameter, called  $Q$  coda, studying is a worldwide motivation. Geometrical spreading, scattering attenuation due to heterogeneities and intrinsic absorption due to inelastic properties of the media are some reasons to decay of wave amplitude or energy during its propagation. Numerous papers have been published reporting changes in coda  $Q$  associated with the occurrence of major earthquakes in time and space showing a correlation with seismicity. In order to develop a physical model to account for the above observations, we shall look at the phenomena from dilatancy-diffusion model viewpoints. Seismic coda waves of short-period S waves were estimated from local earthquakes for 4-8 Hz frequencies of the coda before doublet Ahar-Varzaghan (Mw 6.5, Mw 6.3 2012). The inherent large error of every single measurement can only be reduced by averaging over many events. So, coda measured both 7 and 11 consecutive earthquakes, respectively each set sharing three and five common earthquakes with their neighbours. Due to our results, coda variation before Ahar-Varzaghan is compatible with dilatancy-diffusion model. Based on available model, we can model the time and magnitude estimation of the major shock; however, we believe additional data can improve the model for the whole region.

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