



## Source analysis of the August 11, 2012 Varzaghan twin earthquakes in NW Iran

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On 11th of August 2012, Varzaghan city in northwest of Iran experienced two earthquakes within a short time interval. The first earthquake with magnitude 6.4(Mw) at 12:23 GMT was followed by another earthquake with magnitude 6.2 (Mw) 11 minutes later, just 10 km from the location of the first one. These two earthquakes were followed by numerous aftershocks with magnitude up to 5.3. The official reports suggest a death toll of 300 and more than 3000 injuries for these twin events. Though the earthquakes were moderate size, they were felt in Azerbaijan and Armenia with no major damage.

The quiescence of seismicity in the close vicinity of the recent intraplate events make the precise identification of the causative fault(s) difficult, though the Ahar fault is reported to be the ruptured fault for these events, which had not been recognized properly before. Westward drift of the Caspian Sea in the NW of Iran and the NNE direction of collision between the Arabian and Eurasian plates control the stress regime in this area.

The Global CMT solution reported a pure strike slip fault for the first earthquake and an oblique thrust fault for the second one. We used broadband data (between 20 to 80°) obtained from IRIS to invert for the slip distribution of these events using the teleseismic body waveform inversion method of Kikuchi and Kanamori. More than 100 waveforms (P, vertical component) have been used for the first earthquake however our choice for the analysis of the second earthquake was limited to just 26 waveforms due to wave interference of the first and second events.

Using the obtained results in inversion, we have calculated the coulomb stress transfer to study the possible triggering effect of the first earthquake on the second one and the correlation between the area of stress shadow and/or excitation with the aftershocks distribution.