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Analysis of the 2012 Ahar-Varzeghan (Iran) Seismic Sequence: Insights from Statistical and Stress Transfer Modeling

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Abstract

The 2012 Ahar-Varzeghan (Northwestern Iran) earthquake doublet and its following seismic sequence are analyzed in this paper. First, it is examined the time-varying statistical characteristics of seismic activity since the occurrence of the doublet (two large events with $M_w=6.4$ and 6.2) that initiated the sequence on 11 August 2012. A power law magnitude-frequency distribution ($1.9 \leq M \leq 6.4$) is obtained, with relatively low b-values for the complete series indicating the existence of relatively large magnitudes and high-stress level in the area. The Omori-Utsu model of the aftershock population decay with time shows a moderate decrease in activity rate. An epidemic-type aftershock sequence model that separates background seismicity from triggered aftershocks is then used to describe the temporal evolution of the seismicity during the period following the occurrence of the

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