



## **Results of 2010-2016 Azerbaijan seismicity data analysis using seismological and topological statistical methods**

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Azerbaijan is a very seismically active zone in the world; it was struck by very intense and destructive earthquakes with magnitude even larger than 6. Since the last earthquake occurred in the Caspian Sea on November 25th, 2000 (M6.3), the seismic monitoring of Azerbaijan was upgraded by installing modern telemetric stations with satellite communications system, which have been providing a quite good spatial coverage of the entire territory.

In this study, we provide a detailed analysis of the time and magnitude distribution of the 2010-2016 Azerbaijani seismic catalogue (data from RCSS-ANAS). The time variation of several statistical parameters describing the complex time dynamics of the seismicity of Azerbaijan from 2010 to 2016 is investigated. Besides the well known Gutenberg-Richter b-value and the coefficients of variation, two quantities, derived by the recent method of horizontal visibility graph (HVG) are analysed, namely the mean connectivity degree, which depicts an innovative way to link seismic events, and the Kullback-Leibler Divergence (KLD) that informs about the irreversibility of the seismic process. Our findings indicate the emergence of pre- and co-seismic patterns in the time variation of all the analyzed parameters in relationship with the strongest events of the Azerbaijan seismic catalog. We found that the b-value is featured by the typical increase-decrease behavior before the occurrence of large shocks. The coefficients of variation have shown statistically significant time-clustering of the sequence during the period of occurrence the largest events, and in most cases even before. The mean connectivity degree and the KLD have revealed anomalous values in association with the occurrence of large events, in agreement with the view of earthquakes as irreversible ruptures of the crust.

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