Milen Tsekov, Valentina Hristova. LONG-TERM CORRELATIONS IN BULGARIAN SEISMIC DATA

We analyze long-term temporal correlation properties of interoccurrence times between earthquakes derived from two earthquake catalogues characterizing Bulgarian seismicity: (1) Bulgaria catalogue of earthquakes over the time period 1981-1990 published by the Bulgarian Academy of Sciences, and (2) the catalogue of the USA National Earthquake Information Center (NEIC) for earthquakes after 1990. We apply the Detrended Fluctuation Analysis (DFA) method to quantify long-term correlations in the data. For both catalogues we find evidence for long-term power-law correlations with scaling exponent $\alpha > 0.5$ indicating long-term memory and positive persistence. We also find that the scaling properties of the interoccurrence intervals are not temporally invariant but change with time. Specifically, for certain time periods we observe threshold magnitude dependence of the scaling exponent with tendency toward randomness for larger threshold magnitudes while for other time periods we do not observe significant change in the long-term correlation properties of the records over the range of threshold magnitudes from $M = 2.8$ to $M = 3.3$ or we even observe a slight increase of the persistence over the considered range of threshold magnitudes. We also demonstrate that systematic trends in the number of missed weak and moderate seismic events lead to a specific crossover behavior of the fluctuations of interoccurrence intervals.

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