

Peculiarities of seismic activity dynamics in Northern and Southern California

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The paper attempts to answer the question of whether it is possible to consider territorially adjacent seismoactive regions as interconnected. We used data on earthquakes from two regional catalogs - Northern and Southern California from 1984 to 2007, created by two independent seismological organizations. The series of daily sums of earthquakes and average daily magnitudes formed from the aforementioned catalogs without selection by any parameter were analyzed.

When analyzing the time series, the Hurst exponent, which characterizes the fractal dimensionality of a chaotic process, was used. Note that the Hurst exponent calculated over the entire time interval (from 1984 to 2007) is the same for both regions: $H=0.86$. Upon further consideration, an anti-correlation was found between long-period (several tens of years) variations in the accumulated deviation from the average Hurst exponent characterizing the chaotic properties of seismic activity in Northern and Southern California. Anti-correlation is also observed in the dynamics of fluctuations in the average daily magnitude values. In the normalized cross-wavelet spectrum, two time intervals of coherence in the dynamics of seismic activity were noted in the range of periods of 8-16 months and with a period of 64 months.

In the dynamics of the Hurst exponent and in the normalized cross-wavelet spectrum, some peculiarities are observed in the vicinity of two strong earthquakes in Southern California - the Landers earthquake (28.06.1992, $M=7.3$) and Hector Mine earthquake (16.10.1999, $M=7.1$). Thus, arguments in favor of the hypothesis about the nontrivial connection between seismic processes in neighboring regions - Northern and Southern California were found.

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