



## **The comparative analysis of the Earth seismic activity and the variation of the Earth rotation angular velocity.**

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It was shown [Levin, Sasorova 2012], that a cyclic increase and decrease of the seismic activity in different time intervals was observed in spatial-temporal distributions of the earthquakes (EQ) (1900-2012) with magnitude  $M \geq 7$  in northwest part of the Pacific region. The spatial-temporal analysis revealed the periodic changing of the seismic activity and the depth distributions of the strong events in different time intervals.

The Earth rotation angular velocity varies with time. Increasing of the angular velocity of a celestial body rotation leads to growth of oblateness of planet, and vice versa, the oblateness is decreasing with reducing of velocity of rotation. So, well-known effect of instability leads to small pulsations of the Earth surface. The Earth crust in polar areas is compressing with increasing of angular velocity of rotating planet, and it is extensible in the equator zone. The decreasing of rotation velocity leads to opposite result.

The objectives of this work is the comparative spatial-temporal analysis of the seismicity regime variation (events with  $M \geq 7.0$ ) on the whole Earth and in the Pacific region from 1900 up to date and the Earth rotation instability. The two subsets of the worldwide NEIC (USGS) catalog were used (USGS/NEIC from 1973 up to 2012 and Significant Worldwide Earthquakes (2150 B.C. - 1994 A.D.)). The preliminary standardization of magnitudes and removal of aftershocks was fulfilled for the first mentioned above subset of events. In both cases the entire range of observations was subdivided into several 5-year intervals. The temporal EQ distributions were calculated separately for six latitudinal intervals (belts):  $45^\circ$ - $30^\circ$ N,  $30^\circ$ - $15^\circ$ N,  $15^\circ$ - $0^\circ$ N,  $0^\circ$ - $15^\circ$ S,  $15^\circ$ - $30^\circ$ S,  $30^\circ$ - $45^\circ$ S. The high latitudes do not take in consideration because of very low seismic activity in these latitudes. Separately were analyzed: the EQs with  $M \geq 8$  for time interval 1900-2012, and the EQs with  $M \geq 6$  for time interval 1700-1900. The data base (<http://www.iers.org>) and data from the work [Morrison, 1973, Nature] was used to analysis of the variation of the Earth rotation angular velocity from 1676 to 2012 years.

The clear expressed peaks and decays of the seismic activity were marked in temporal EQ distributions over studied latitudinal belts. The peaks and activity decays of the seismicity do not coincide in time for different latitudinal belts. It was marked distinct decay of the seismic activity from 1984 for latitudinal belts  $45^\circ$ - $30^\circ$ N and  $30^\circ$ - $15^\circ$ N. On the other part it may be observed seismic activity increasing from 2000 year for latitudinal belts  $0^\circ$ - $15^\circ$ S and  $15^\circ$ - $30^\circ$ S, and seismic decay from 1925 to 1955 and from 1975 to 1995 for these belts.

It was shown that the sharp peaks of seismic activity correlate in time with the periods of the increasing of the absolute value of the gradient of the Earth rotation velocity (for example in period 1905-1920).