Geophysical Research Abstracts, Vol. 7, 01327, 2005
SRef-ID: 1607-7962/gra/EGU05-A-01327

The within-year variability in the earthquake distributions for some regions of the Earth.

E. Sasorova (1), Sergey Zhuravlev (1), Boris Levin (1)

Shirshov Institute of Oceanology, Russian Academy of Sciences
(sasor@orc.ru/+70951245983)

Recent research has shown that the Earth's seismicity and probability of the earthquake occurrence in given region depends on the astronomical reasons: the geographical latitude and longitude of the event, the relative attitude of the Earth, the Sun and the Moon. It was observed in some regions that the seismic events occur in some months more often than in another. The goal of our work is testing of hypothesis about within-year variability existence. If the within-year variability exists then occurrences of the seismic events depend on the Earth position on ecliptic plane or on factors that are varied during the Earth's motion on ecliptic plane. The analysis of the annual earthquake distributions in some regions of the Earth (South and Central America, Aleutian Islands, Kamchatka Peninsula, Kuril Islands and others) was carried out. The worldwide catalogs ISC and NEIC were used for preparation the list of events for every of chosen region. The events with Mb>=4 since 1966 and events with Ms $>$ 7.0 since 1973 were chosen from mentioned above catalogs. The aftershocks were canceled from the list. All events for every region were subdivided into following magnitude levels: 4<=Mb<4.5; 4.5<=Mb<5; 5<=Mb<5.5; 5.5<=Mb<6.0; 6<=Mb<6.5; 6.5<=Mb; 7<= Ms <7,5; 7,5<= Ms <8,0 and 8,0<= Ms. Then we are checking if the distributions of the events during the year period are uniform or these distributions are non- uniform. We are testing it separately for every magnitude level and for each region. The null hypothesis was accepted that our data sets are from uniform distributions, and then we try disproving the null hypothesis. Our data sets are binned data and we use the Chi-Square test for unsparse sequence and method of statistical testing (Monte-Carlo) for sparse sequence. The null hypothesis about uniform EQ distributions in the course of year was disproved for some regions (with more than 95% significance level). The noticeable increase number of seismic events in short

time intervals as a rule two times in a year, and significant reducing of seismic activity in the rest part of the year was shown. The maximum peak of the event number occurs in most cases when the Earth position on the ecliptic plane is near the perihelion period (minimum of the Earth-Sun distance, 3 January). The second peak connected as a rule with annual variations of the Earth's rotation speed.