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Peculiarity of the temporal distributions of seismic events in the Central America and Mexico.

E. Sasorova (1) and B. Levin (2)

(1) Shirshov Institute of Oceanology RAS, Tsunami Laboratory, Moscow, Russian Federation (sasorova_lena@mail.ru), (2) Institute of Marine Geology and Geophysics, Far East Branch of Russian Academy of Sciences, Yuzhno-Sakhalinsk, Russia.

At first the interannual earthquake distributions and its peculiarity in predetermined region are considered. The hypothesis about within-year variability existence for the events of various energy levels was tested. The world-wide catalogs ISC (International Seismic Catalog) and NEIC (USGS) were used. It was extracted all EQs for the Pacific part of the given region from 1964 with Mb>=4.0. The entire set of events under analysis was divided into several magnitude ranges (MR). The analysis of the completeness of events in defined MRs was carried out. The aftershocks were canceled from the list. Further analysis was performed separately for each MR. Then the events in each magnitude level were subdivided once again into two groups: shallow events (H<=Htr) and deep events (H> Htr), where Htr is depth threshold value. Then we are checking if the distributions of the events during the year period are uniform or these distributions are no uniform. We are testing our data separately for each magnitude level and for every depth level. The null hypothesis about uniform EQ distributions in the course of year was disproved for the most samples with shallow EQ (95%). But the null hypothesis was confirmed for deep earthquakes. We use the Chi-Square test for well-filled sequences and method of statistical testing for poor-filled sequences. The Htr value determines the boundary, which divided the seismic events in two groups. If the EQ's sources located above this boundary then such EQ's are distributed non-uniformly in the course of year. While if the EQ sources located below this boundary then distribution of such EQ during the year period are uniform. It was found by using special software procedure that the Htr boundary between the shallow and the deep events in the most cases was arranged in deep 60-80 km. The noticeable increase number of seismic events in short time intervals as a rule two times in year, and significant reducing of seismic activity in the rest part of the year was shown. It was determined where peaks of seismic activity are located.

The entire set of events firstly was partitioned into three subsets in compliance with depth of the EQ source: the shallow EQs, the intermediate EQs and the deep EQs. The time series (TS) were formed for each subset. Then the spectrum analysis for each TS was carried out. We calculated power spectrum density (PSD) and 95% confidence interval for every TS. The representative periods for all well-filled TS were detected. The periods: 10-13, 6.7, 2-3, 1 and 0.5 years were extracted for shallow EQs. The detected periods: 13, 6.7-5.5 and 1 years were typical for intermediate events. We failed to find the characteristic periods for TS of the deep events. These events are distributed in a random way. Then we try to verify hypothesis about correlation existence between TS whose belong to the same depth interval but to different MRs. It was shown that reliable correlation in time between the events from different magnitude ranges does not exist.