Latitudinal distributions of seismic events for the whole Pacific, eastern part of the Pacific and the Mexico with the Central America.

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

(1) Institute of Marine Geology and Geophysics, of FEB Of RAS, Yuzhno-Sakhalinsk, Russian Federation (levinbw@mail.ru), (2) Shirshov Institute of Oceanology of Russian Academy of Sciences, Moscow, Russia

The objective of this work is the analysis of the statistically valid regularity of the EQ distribution in depth and in latitudinal belts for different magnitude ranges (MR). The worldwide catalog ISC (from 1964 with Mb>=4.0) were used. The entire set of events under analysis was divided into several MR. The analysis of the completeness of events in defined MRs was carried out. Further analysis was performed separately for each selected MR. Every region under study was divided in several latitudinal intervals (size of every interval was either 10^0 or 2^0). The latitudinal distributions of the EQ number and energy released by EQ were calculated. The number of events in each latitudinal interval was normalized two times and we obtain relative seismic event number generated per one kilometer of the plate boundary. Firstly the analysis of these distributions for the whole Pacific was carried out with the size of the latitudinal belt 10^0. Double normalized latitudinal distributions have clearly expressed bimodal character with two peaks located in Northern Hemisphere (40˚–50˚N, i.e. Kuril Islands. and Japan) and in Southern Hemisphere (20˚–30˚S, i.e. Oceania northward to New Zealand and South America), local minimum near the equator (10˚–20˚ N) and almost zero values in the regions of the polar caps.

Then the similar analysis of the latitudinal distributions was repeated two times for the eastern part of the Pacific with the size of the latitudinal belts 10^0 and 2^0. Double normalized latitudinal distributions for the latitudinal scale 10^0 have also bimodal character with two peaks (in Southern Hemisphere 20˚–30˚and 10˚–20˚ in Northern Hemisphere) local minimum near the equator (0˚–10˚ N) and almost zero values in the regions of the polar caps. If we used latitudinal scale 2^0 the main peak in Southern Hemisphere (20˚–30˚) partitioned in two clearly expressed peaks: 24˚–28˚ and 32˚–36˚. The latitudinal distributions of the EQs number and released energy are similar.

Then the comparative analysis was executed for latitude-depth distributions of the EQs. The analysis of EQ energy distributions over the depth in each latitudinal belts shows, that full interval of depth in every belt divides into three parts (clusters) with close-cut separation boundaries (k1 - with 0<H<=80 km, k2 - with 120<H<=240 km and k3 - with H>=500 km). The peculiarity of the latitude-depth distributions of the EQs number and released energy for the Mexico and Central America was considered. The feasible explanations of the obtained results are discussed.