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Latitudinal distribution of earthquakes in the Andes and its peculiarity

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Abstract. In the last decade, there has been growing interest in problems related to searching global spatiotemporal regularities in the distribution of seismic events on the Earth. The worldwide catalogs ISC were used for search of spatial and temporal distribution of earthquakes (EQ) in the Pacific part of South America. We extracted all EQ from 1964 to 2004 with $M_b \geq 4.0$. The total number of events under study is near 30 000. The entire set of events was divided into six magnitude ranges (MR):

$4.0 \leq M_b < 4.5$; $4.5 \leq M_b < 5.0$; $5.0 \leq M_b < 5.5$; $5.5 \leq M_b < 6.0$; $6.0 \leq M_b < 6.5$; and $6.5 \leq M_b$. Further analysis was performed separately for each MR. The latitude distributions of the EQ number for all MR were studied. The whole region was divided in several latitudinal intervals (size of each interval was either 5° or 10°). The number of events in each latitudinal interval was normalized two times. After normalization we obtained the relative seismic event number generated per one kilometer of plate boundary. The maximum of seismic activity in the Pacific part of the South America is situated in latitude interval 20° – 30° S. The comparative analysis was executed for the latitude distributions of the EQ number and the EQ energy released. Then the distributions of EQ hypocenter location in latitude and in depth were studied. The EQ sources for the high latitudes (up to 35° S) are located on the depth (H) between 20–80 km. It was shown, that full interval of depth in each latitudinal belt generally divides into three parts (clusters) with close-cut separation boundaries (K1 – with $0 < H \leq 80$ km, K2 – with $120 < H \leq 240$ km and K3 – with $H > 500$ km).

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