



## **Variations in frequency of earthquakes occurrence with season and local time on example of Northern Tien Shan**

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Some year ago Khachikyan et al. [2012, IJG, doi: 10.4236/ijg.2012.35109] noticed that earthquakes prefer occur more often in those seismic regions where the geomagnetic  $Z$  - component estimated in geocentric solar magnetosphere coordinate system (GSM) has the high positive values. The GSM coordinate system has its  $X$  axis towards the Sun and its  $Z$  axis is the projection of the Earth's magnetic dipole axis (positive North) on the plane perpendicular to the  $X$  axis. The  $Y$ -axis completes a right-handed coordinate system, it is defined to be perpendicular to the Earth's magnetic dipole so that the  $X$ - $Z$  plane contains the geomagnetic dipole axis. For any particular geographical point, the geomagnetic components in GSM coordinate system vary with local time and season. In mentioned paper, the International Geomagnetic Reference Field (IGRF-10) model has been used to calculate  $Z_{GSM}$  values in epicenters of 173477 earthquakes with  $M \geq 4.5$  occurred at the globe in 1973-2010 years from the global seismological USGS NEIC catalogue. It was shown that  $Z_{GSM}$  values are mainly large and positive in epicenters located at low latitudes ( $30^{\circ}S - 30^{\circ}N$ ), especially in the east longitudinal sector, where earthquakes occur more often. To investigate temporal variations of earthquake occurrence in relation to  $Z_{GSM}$  variations, it is better to analyze data for small area where  $Z_{GSM}$  does not vary strongly with latitude and longitude. At the first step, we carried out such analysis for local seismic area in Northern Tien Shan restricted with coordinates  $42.83N - 43.5N$ ;  $76E - 78E$  for earthquakes with representative here energy class of  $\geq 7.0$ . It is shown that in this region,  $Z_{GSM}$  reaches the largest values around local midnight in winter but around local noon in summer. Seismic data showed that in winter season (November - February) earthquakes occur here more often in evening and night hours, while in summer season (May - August) they occur here more often in day-time hours, that prove a suggestion on geomagnetic control of seismicity.