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Influence of LOD variations on seismic energy release

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Tidal friction causes significant time variations of geodynamical parameters, among them geometrical flattening. The axial despinning of the Earth due to tidal friction through the change of flattening generates incremental meridional and azimuthal stresses. The stress pattern in an incompressible elastic upper mantle and crust is symmetric to the equator and has its inflection points at the critical latitude close to $\pm 45°$. Consequently the distribution of seismic energy released by strong, shallow focus earthquakes should have also sharp maxima at this latitude.

To investigate the influence of length of day (LOD) variations on earthquake activity an earthquake catalogue of strongest seismic events (M>7.0) was completed for the period 1900-2007. It is shown with the use of this catalogue that for the studied time-interval the catalogue is complete and consists of the seismic events responsible for more than 90% of released seismic energy. Study of the catalogue for earthquakes M>7.0 shows that the seismic energy discharged by the strongest seismic events has significant maxima at $\pm 45°$, what renders probably that the seismic activity of our planet is influenced by an external component, i.e. by the tidal friction, which acts through the variation of the hydrostatic figure of the Earth caused by it.

Distribution along the latitude of earthquake numbers and energies was investigated also for the case of global linear tectonic structures, such as mid ocean ridges and subduction zones. It can be shown that the number of the shallow focus shocks has a repartition along the latitude similar to the distribution of the linear tectonic structures. This means that the position of foci of seismic events is mainly controlled by the tectonic activity.