



Deformation processes of the Lithosphere and relations to strongest earthquakes and global geodynamics of the Earth

V. Milyukov (1), L. Latinina (2), A. Mironov (1), and A. Myasnikov (1)

(1) Moscow University, Sternberg Astronomical Institute, Moscow, Russian Federation (milyukov@sai.msu.ru, +7 095 9328841), (2) Institute of Physics of the Earth, Russian Academy of Science, Moscow, Russian Federation

The question of the global mechanism influencing state of the Lithosphere and probably being trigger for the strongest earthquakes is discussed. As one of possible mechanisms, we had been considered geodynamic rotational model in which processes of redistribution of the stress-strain state of earth crust, including places of preparation of seismic events, are classified as reaction of the angular momentum of lithospheric blocks on change of the speed of rotation of the Earth. In development of this idea the relation of the local deformation fields, which are displays of deformation processes of global character, with global seismic activity and variations of speed of rotation of the Earth has been studied.

The correlation analysis was based on the original strain data from two space separated (2000 km) observation stations, equipped by geophysical laser interferometer (the Northern Caucasus) and quartz strainmeter (Moscow region), time series of global seismicity constructed on data of the USGS NEIC catalogue and time series of the variations of speed of the Earth rotation (the length of the days, LOD) from the IERS catalogue. Significant correlation links in the dynamics of strain fields for different parts of the earth's crust, caused by external effects, are found. The correlations between local deformation processes and global seismicity reaches significant values only in the periods of preparation of strongest earthquakes with magnitudes >7 . It testifies that strongest earthquakes connect with global tectonic processes, indications of which can be synchronous and similar perturbations in the strain fields of different parts of the Lithosphere. The analysis shows that variations of LOD, causing changes of the centrifugal force of the Earth rotation, exert the essential effect on the lithospheric deformations. This effect can be a reason of the existence of the deformations having a global character and to serve a trigger mechanism for catastrophic earthquakes.

This work is supported by the Russian Foundation for Basic Research under Grants No 07-05-00786 and No 07-05-13573.