

Determination of secular and seasonal Geocenter variations with the use of space geodetic techniques.

S.P.Kuzin, S.K.Tatevian

0.1 Institute of Astronomy, RAS, Moscow, Russia. statev@inasan.ru

A position of the center of the Earth's mass plays a crucial role as an origin of the terrestrial reference system and should be determined and monitored with the highest accuracy. Variations of the Geocenter position may be explained by the surface and internal masses redistribution. Theoretically the spectrum of the Geocenter oscillations is a sum of spectra from all geophysical processes, responsible for mass redistribution. In our investigation we pay the main attention on secular and seasonal Geocenter variations (annual and semiannual) as the most significant ones in comparison with other periods. Five time series of the Geocenter solutions were used for comparison: two DORIS solutions, one GPS global solution on span 1993.0 – 2005.4 and two SLR solutions. Results of spectral analysis of the estimated time series of Geocenter variations shows that annual and semiannual amplitudes of oscillations are varied for different types of measurements and may differ within 1.0 – 22.8 mm along the each coordinate axis. Besides, Z-component is always 2-3 times more than the horizontal components. All three types of measurements expose a well-defined secular trend in the Geocenter motion with an amplitude of 1-4.8 mm. It is shown, that space geodesy techniques are sensitive to the variations of Geocenter. The SLR solution better coincides with the predicted theoretical values. GPS and DORIS solutions have slightly higher amplitudes for x and y components compare with the SLR and significantly higher amplitudes for z component.