Geophysical Research Abstracts
Vol. 13, EGU2011-4624, 2011
EGU General Assembly 2011


# Variations of the Atmosphere Angular Momentum and the Irregularities of The Earth Rotation

Leonid Akulenko (1), Yury Markov (2), Vadim Perepelkin (2), and Lidiya Rykhlova (3)

(1) Institute of mechanics of RAS, Moscow, Russia, (2) Moscow aviation institute, Moscow, Russia (vadimkin1@yandex.ru), (3) Institute of astronomy RAS, Moscow, Russia

The generalization taking into account the corrections on disturbances of the tide-forming geo-potential and the oscillations of the atmosphere angular momentum (AAM) is worked out with the help of the methods of celestial mechanics on the base of the model of inter annual irregularity of the Earth rotation. Due to the quasi-static problem statement it is stipulated that the dynamics of the thin near-the-Earth atmosphere layer is caused by the gradient of the tide-forming potential maintained the forced oscillations of the structure of the mantle and the atmosphere shell as the whole. So the constructing of the model and the simulation of the global components of the atmosphere tides on the base of the celestial-mechanical model of the Earth rotation irregularity represents to be rational and more natural one.

The analysis of the constructed model of the variations of the Earth axial rotation and the observations NCEP/NCAR data let us to determine the model of the AAM global component. During this the tidal model coefficients (the tidal humps and bulges) expresses by the quasi-periodic functions of a time with the main frequencies of the lunar-solar gravitational-tidal actions and the other factors as possible. It is implied that the frequencies set may be corrected during the numerical simulation proceed from the forecast precision requirements, its duration and mechanical problem statement. It is shown by the comparison of the numerical simulation with NCEP/NCAR data that the constructed model of the Earth rotation irregularity may be used effectively for the interpolation and the forecast of the axial AAM.

The analysis of the amplitude modulation of the AAM inter diurnal variations is carried out. The approximate correspondence of the axial AAM oscillations and the amplitude modulation of its inter diurnal variations on the near-hood to lunar month periods is determined in average. The parameters of the determined correspondence are the functions of a time and depend on parameters of the inter diurnal and near-diurnal AAM variations. The magnitude of correlation coefficient for these values is within the limits from 0.44 till 0.70 on the year time interval and reaches the value 0.95 on the month time intervals.