

SEASONAL DEPENDENCE OF THE NORTH-SOUTH ASYMMETRY IN THE NEUTRAL UPPER-ATMOSPHERE

ERZSÉBET ILLÉS-ALMÁR

Konkoly Observatory of the Hungarian Academy of Sciences, Budapest, Hungary,
e-mail: illes@konkoly.hu

In an earlier paper it was demonstrated that there is a North-South asymmetry in the density of the upper-atmosphere. The density in average is higher over the Northern hemisphere. Looking for the origin of this asymmetry an investigation is carried out on its seasonal dependence. It is based on two kinds of measurements: density data from satellite orbital decay analysis and in situ accelerometric measurements. The previous database contained many parallelly existing satellites with inclinations between 0 and 60°. The in situ CACTUS accelerometric measurements were more accurate – but no other simultaneous measurements stayed at our disposal in order to separate the time and space dependence. Moreover because of the low orbital inclination of the CASTOR satellite (30°) it sampled only the low geographical latitudes. The North-South asymmetry seems to be stronger in the local spring (March-May in the Northern, Sept.-Nov. in the Southern hemisphere). The other seasons require further analysis. We intend to investigate the possible forcing mechanisms from below. One of the proposed mechanisms can be the different surface coverage of the two hemispheres by continents and oceans. Another mechanism can be the different dust content of the lower atmosphere. As the dust from the deserts is lifted up by the zonal winds into the troposphere, a lifted layer appears in the atmosphere as a heat source. The consequence of this lifted heating layer can be an upward expansion of the atmosphere similarly to the diurnal bulge. But because of the zonal winds this expansion may be restricted to the latitudinal zones of the large deserts. The expansion of the atmosphere may reach the heights where the satellites are orbiting and therefore they might observe higher densities there.

hemispheric asymmetry, seasonal dependence, density of the neutral upper-atmosphere

Erzsébet Illés-Almár, Konkoly Observatory of the Hungarian Academy of Sciences H1121
Budapest, Konkoly Thege Miklós út 13-17 Hungary, tel: +3613919327, fax: +3612754668,
e-mail: illes@konkoly.hu