

Nonlinear interactions of tides and planetary waves in mesosphere – lower thermosphere.

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The effects of nonlinear interaction in the context of quadratic nonlinearity were investigated. The investigations conducted on the base of experimental data for winter and summer (1986-1994) on wind velocity in the field of zonal and meridional circulation at heights 80-100 km. Experimental data on wind velocity were obtained by meteor radar with altimeter of Kazan State University (56N, 49E).

The following results were obtained:

- The multiwave structure of tidal motions due to nonlinear quadratic interactions detected at the heights of mesosphere- lower thermosphere in winter and summer periods was determined.
- The multiwave structure is most clearly pronounced in summer period in the field of zonal wind at heights 80-83 km and in the field of meridional wind at the height 98-101 km as a result of interaction with planetary waves from 2 to 30 days with the most distinct secondary waves corresponding to the interaction of diurnal and semi-diurnal harmonics with planetary waves (2-7 days).
- It should be marked that both for summer and winter periods secondary waves corresponding to nonlinear interactions of diurnal and semidiurnal tides and two diurnal wave were clearly pronounced.
- It was determined that frequency instability of two diurnal waves is the result of its nonlinear interactions with planetary waves (4-30 days).
- Multiwave structure of tides in mesosphere – lower thermosphere causes broadening of spectral components in a diapason of diurnal and semi-diurnal harmonics for zonal and meridional wind and for indiurnal variations of ionospheric parameter foEs.