

## **Diurnal tidal motions at heights 0-31 km.**

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Data of NCEP/NCAR (4 measurements per 24 hours) have been used to calculate amplitudes and phases of diurnal oscillations of temperature and zonal wind and meridional wind (0-31 km) for every day of each month for a period 1958-2003.

Time variations of amplitudes and phases of diurnal oscillations have modulation corresponding to time scales of planetary waves (2-30 day).

We have analyzed height profiles of amplitudes and phases of diurnal oscillations of temperature and zonal wind and meridional wind and height profiles of amplitudes and phases of annual and semi-annual oscillations of aforementioned parameters.

Critical layers at upper troposphere – tropopause – lower stratosphere heights have been discovered. Height profiles signify presence of different modes of diurnal tide which show different direction of vertical propagation of the modes and their different vertical lengths' of the waves.

Height profiles of annual and semi-annual oscillation amplitudes show features of height profiles of phases at heights of upper troposphere – tropopause – lower stratosphere.

Discovered patterns were explained by non-linear interactions of wave disturbances with scales of tidal and planetary waves and by interaction of the waves with background motions.