CLIMATOLOGY OF THE ~5-DAY ROSSBY AND ~6-DAY KELVIN WAVES SEEN IN THE SABER/TIMED TEMPERATURES (2002-2007)

DORA PANCHEVA, Plamen Mukhtarov, and Borislav Andonov

Geophysical Institute, Bulgarian Academy of Sciences, Sofia, Bulgaria

The presentation is focused on the global spatial (altitude and latitude) structure, seasonal and interannual variability of the ~5-day Rossby (W1) and ~6-day Kelvin (E1) waves derived from the SABER/TIMED temperature measurements for full 6 years (January 2002-December 2007). The latitude structure of the ~5-day W1 wave is related to the gravest symmetric wave number 1 Rossby wave, i.e. the (1,1) mode. Its seasonal behavior is dominated by equinoctial amplifications; in the NH the wave amplifies in March-April and September, while in the SH – in March and November. The vertical structure of the ~5-day Rossby wave amplitude revealed double-peaked maxima centered at ~80-90 km in the mesosphere and ~105-110 km in the lower thermosphere, as the lower thermospheric maximum is at least two times stronger than the mesospheric one. This is a vertically propagating wave from the stratosphere up to 120 km altitude with a mean vertical wavelength of ~50-60 km. The ~5-day Rossby wave at middle latitudes (40^o) revealed some interannual variability and at least part of it is connected with the effect of QBO. The ~6-day E1 wave is equatorially trapped wave located between 20^oN and 20^oS. Its seasonal behavior indicated some equinoctial and June solstice amplifications. The altitude structure of the ~6-day Kelvin wave phase indicated that this is a vertically propagating wave up to 110 km altitude. The mean vertical wavelength in the stratosphere and mesosphere is ~25 km, however above 95 km altitude the vertical wavelength shortened to 15 km. The ~6-day Kelvin wave indicated significant SAO and QBO variability.

5-day internal normal mode, 6-day Kelvin waves, stratosphere-mesosphere-lower thermosphere coupling

Dora Pancheva, Geophysical Institute, Bulgarian Academy of Sciences, Acad. G. Bonchev Str., Block 3, 1113 Sofia, Bulgaria; tel.: +359 2 9793308, fax: +359 2 9713005, email: dpancheva@geophys.bas.bg