

IMPACT OF THE LUNAR GRAVITATIONAL TIDE ON DYNAMICAL PROCESSES IN THE UPPER STRATOSPHERE BASED ON ERA-5 REANALYSIS DATA

Denis Khabituev, Olga Zorkaltseva

*Institute of Solar-Terrestrial Physics SB RAS, Irkutsk, Russia,
khabituev@iszf.irk.ru*

Gravitational tides of the Moon and the Sun are manifested in their impact on different geospheres: from the lithosphere to the upper layers of the atmosphere. It is well known that seismic activity increases during full moons and super moons. The influence of lunar tides on atmospheric processes is often considered insignificant and only short-period semidiurnal and diurnal waves are considered. In this study, we investigate the influence of long lunar waves with a period from two weeks to dozens of years on dynamical processes in the upper stratosphere. Based on ERA-5 reanalysis data for the period from 1979 to 2023, a spectral analysis of wind velocity variations (in 3 dimensions) at altitudes from 1 to 10 hPa is performed. It is shown that there is a statistically significant relationship between the strength of variations in different components of wind velocity and the periods of the maximum influence of the gravitational lunar tide.

This work was supported by the Russian Science Foundation project No. 22-77-10008.