

REVIEW
ON THE BACHELOR GRADUATION PAPER
"Seasonal dependence of the amplitudes and structure of nonmigrating tides"
presented by Ms. Irina Fedchenko, student of МП-Б15-1-1

The work is devoted to studying the variability of the main components of migrating and nonmigrating atmospheric tides based on data from the modern ERA5 reanalysis. The relevance of such a study is due to the fact that only in recent years new archives of reanalyses data (MERRA-2, ERA5) have appeared, which allow us to investigate the global picture of high-frequency planetary waves (which include atmospheric tides) and explore the temporal variability of their characteristics. In the past archives of reanalyses (for example, NCEP/NCAR, ERA-Interim) contained 6-hourly data and allowed to investigate (at best) the characteristics of only diurnal tides. The new project ERA5 provides archives of hourly data reanalysis, which allows us to consider the characteristics of high-frequency components (12 and 8-hourly tides). The practical significance of the study of atmospheric tides and their variability is the need to take into account daily variations in atmospheric parameters in empirical atmospheric models that are used for ballistic calculations when planning spacecraft launches.

Fedchenko I.A., using one (2018) year data, performed an analysis of seasonal variations of migrating and nonmigrating atmospheric tides, as well as using the complex wavelet transform, investigated the intra-seasonal variability of their amplitudes. It should be noted that the characteristics of atmospheric tides in recent years have been intensively studied on the basis of satellite measurements (the COSMIC project, the UARS, TIMED, EOS Aura satellite data). The disadvantage of these studies is that due to the insufficient space-time coverage of these satellite data, only the monthly average characteristics of atmospheric tides can be studied. The results obtained by I.A.. Fedchenko indicate that atmospheric tides (despite the regularity of daily variations in atmospheric heating due to the absorption of solar radiation) demonstrate significant variability, both with the season and intra-seasonal. This result is fundamentally important, since on the basis of the obtained estimates it is possible to plan the analysis of satellite data, i.e. select the averaging period.

The disadvantage of the work is that the statistical significance of the results obtained is low (the data were analyzed only for one year). For the final conclusions, a similar analysis is needed for at least 10 years. The set of ERA5 reanalysis data allow it.

The market disadvantage does not diminish the importance of the obtained results. I understand this work is just the beginning of Irina Fechenko research work, the investigation of problem that he managed requires more efforts and time.

As I said, this work makes good impression, contains interesting results, and I would recommend giving a high positive mark to the student.

Reviewer



Prof. Dr. Nikolai Gavrilov

St.Petersburg State University

« 6 » 06 2019 г.

ЛИЧНУЮ ПОДПИСЬ ЗАВЕРЯЮ

НАЧАЛЬНИК БЮРО КАДРОВ №3

Н. И.



ДОКУМЕНТ
ПОДГОТОВЛЕН
ПО ЛИЧНОЙ
ИНИЦИАТИВЕ

Текст документа размещен
в открытом доступе
на сайте СПбГУ по адресу
<http://spbu.ru/science/expert.html>