

## НАУКИ О ЗЕМЛЕ

УДК 55

**Dodonova Irina Aleksandrovna, the teacher of physics, the master of physical and mathematical education**Nizhny Novgorod State Pedagogical University. K. Minin  
School of FGBOU «SOSH MDC «Artek» (Russia, Nizhny Novgorod)**Vaapova Zeynep Ruslanovna, student**

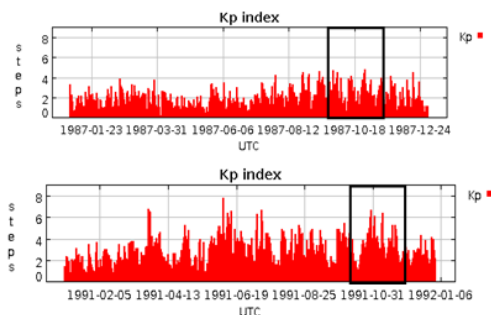
School of FGBOU «SOSH MDC «Artek» (Russia, Nizhny Novgorod)

**FEATURES OF THE INFLUENCE OF SOLAR ACTIVITY ON THE SPATIAL DISTRIBUTION OF IONOSPHERIC DISTURBANCES**

*The physics of the near-Earth space, especially in terms of space weather, is currently the subject of considerable attention of scientists and researchers and is one of the most urgent fields of science. Presentations of the space weather, that is, dynamic, highly variable conditions in the near-Earth environment, include conditions on the Sun, in the interplanetary space, in the magnetosphere-ionosphere system and the Earth's atmosphere.*

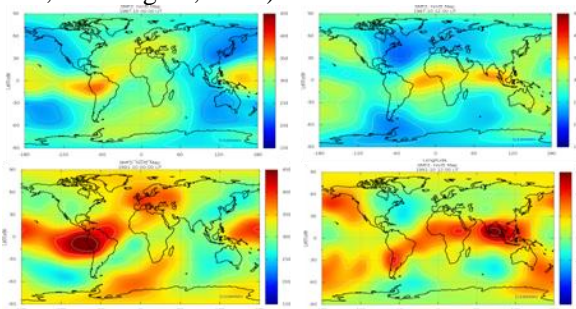
*Keywords: solar activity, ionospheric disturbances.*

The purpose of our work is to get the information about the influence of the solar activity on the state of the ionosphere in the years of maximum and minimum of the solar activity in the latitudinal and meridional directions. One of the point of the studying that characterizes the number of charged particles in the ionosphere, is the so-called “the critical frequency of the ionospheric layer”. To study the intensity of the geomagnetic disturbance, the Kp index was introduced for descriptions of the variations of the Earth's magnetic field, also selected years of the maximum (1991) and the minimum (1987) of solar activity were analyzed (Fig. 1).



**Fig. 1. Variations of the magnetic field of the Earth in the years of maximum and the minimum of solar activity 1987 and 1991**

The selection of the f<sub>o</sub>F<sub>2</sub> data, the critical frequency of the ionospheric layer F<sub>2</sub> in the years of maximum and minimum of the solar activity, was taken from data obtained from the Intercosmos-19 satellite (Fig. 2), as well as from vertical sounding stations located at the same latitude (Fig. 3) (Moscow, Sverdlovsk and Novosibirsk), and on one longitude (Fig. 4) (Lykssele, Kaliningrad, Sofia).



**Fig. 2. Critical frequency of the ionospheric layer F<sub>2</sub> for the year of minimum and the maximum of solar activity 1987 and 1991**

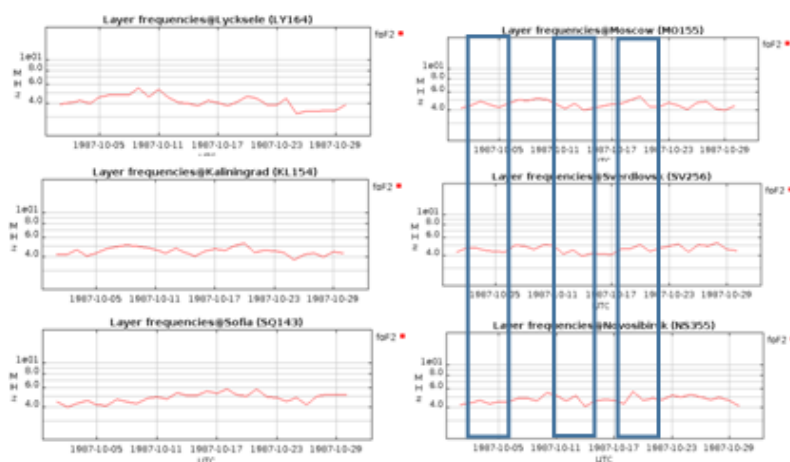


Fig. 3. Critical frequency of the ionospheric layer F2 for the year of minimum 1987 and the maximum of the solar activity obtained from the stations of vertical sensing located on one twice

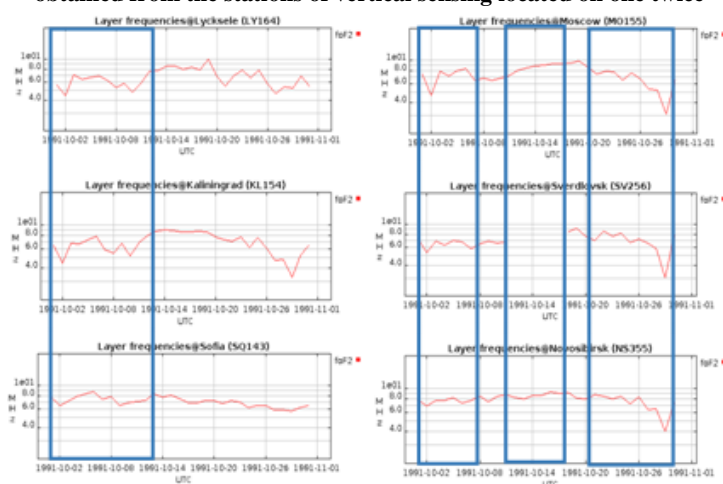


Fig. 4. Critical frequency of the ionospheric layer F2 for the year of minimum 1987 and the maximum of the solar activity obtained from the stations of vertical sensing located on one longe

Based on the analysis of the data, it can be noted that in the year of the maximum of the solar activity, the ionospheric layer F2 at the same latitude does not change. While at one longitude, the ionospheric layer F2 depends on the remoteness of the vertical sounding stations from the auroral region of the polar electrodes: the intensity of charged particles in the ionospheric layer depends on the distance from the auroral ring and decreases when it approaches the equator. The carried out research confirms the suggested assumption that the frequency  $f_0F_2$  of the ionospheric layer F2 does not change in latitudes way, but changes in longitudes way.

### References

1. Бархатов Н.А., Бархатова О.М., Введение в Солнечно-Земную физику: учебно-научное пособие. Нижний Новгород: издательство ГОУ ВПО НГПУ. 2009. 494 с.
2. CLASSIFICATION OF IONOSPHERIC DISTURBANCES AT MIDDLE LATITUDES BASED ON LONG-TERM OBSERVATIONS Barkhatova O.M., Levitin A.E., Dodonova I.A., Kosolapova N.V. Physics of Auroral Phenomena. 2011. T. 34. № 2 (35). С. 125-128.
3. Kutiev, I. and Muchtarov, P. Modeling of midlatitude F-region response to geomagnetic activity. // J. Geophys. Res., 106, 15 501– 15 509, 2001.

**Додонова Ирина Александровна, преподаватель физики, магистр физического и математического образования**  
Нижегородский государственный педагогический университет. К. Минин  
Школа ФГБОУ «СОШ МДЦ «Артек» (Россия, г. Нижний Новгород)

**Ваапова Зейнеп Руслановна, студент**  
Школа ФГБОУ «СОШ МДЦ «Артек» (Россия, г. Нижний Новгород)

### ОСОБЕННОСТИ ВЛИЯНИЯ СОЛНЕЧНОЙ АКТИВНОСТИ НА ПРОСТРАНСТВЕННОЕ РАСПРЕДЕЛЕНИЕ ИОНОСФЕРНЫХ РАССТОЯНИЙ

Физика околоземного пространства, особенно с точки зрения космической погоды, в настоящее время является предметом значительного внимания ученых и исследователей и является одной из наиболее актуальных областей науки. Представления о космической погоде, то есть динамические, сильно изменяющиеся условия в околоземной среде, включают в себя условия на Солнце, в межпланетном пространстве, в магнитосферно-ионосферной системе и в атмосфере Земли.

Ключевые слова: солнечная активность, ионосферные возмущения.