

Analysis of total ozone content for 2010-2019 in Russia

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Problem setting

- In the article, based on information and analytical materials on the results of monitoring environmental pollution, namely reviews of the state and pollution of the environment in the Russian Federation, an analysis of the state of the ozone layer over the territory of Russia was carried out.
- The urgency of the problem is the need to constantly regulate and monitor the state of the ozone layer not only in the Russian Federation, but throughout the world. Continuous monitoring of the state of the ozone layer prevents large-scale threats and accompanies rapid response when necessary.

Purpose, objectives and methods of the research

- The purpose of this article is to analyze the total ozone content over the territory of Russia over ten years according to annual observation data.
- The object of the study is deviation of the average values of the total ozone content from the norm in percentage.
- The Federal Service for Hydrometeorology and Environmental Monitoring (RosHydroMet) monitors the state of the ozone layer over the territory of the Russian Federation.
- The total ozone content is an important characteristic of the Earth's ozone layer. It determines the absorption of ultraviolet (UV) radiation of the Sun in the wavelength region 290-315 nm (the so-called UV-B region)

Purpose, objectives and methods of the research

- Operational data collection, archiving, visualization (mapping of total ozone and ultraviolet radiation fields), analysis of total ozone and ultraviolet radiation fields, sending operational data of the CIS network to the World Ozone and Ultraviolet Radiation Data Center (WOUDC; Canada) are produced at the Central Aerological Observatory (CAO) of RosHydroMet.
- RosHydroMet uses data from national network stations equipped with M-124 filter ozonometers, the measurement error of which is estimated at $\pm (5-8)\%$. The main advantages of these ozonometers are the simplicity of design and operation.

Conclusions

- In the last decade, not counting 2018 and 2019, deviations of the average annual values of the total ozone content from the norm are rather even over the territory of the Russian Federation, except for an abnormally low value (-16%) in 2011. More such strong deviations were not observed over the period considered.
- It can also be noted that over the years the average thickness of the ozone layer has approached the norm, and since 2018 it has been above the norm by only 1.2%.
- In 2016, a steady increase in annual averages was recorded, which RosHydroMet noted the beginning of a new period.
- Since 2018, RosHydroMet has been analyzing the average monthly values of deviations in the total ozone content from the norm according to the data of reanalysis ERAINTERIM, which will give more accurate results.
- Long-term series of observations clearly showed significant differences in the seasonal course of the total ozone content in the long territory of the Russian Federation.