

Investigation of nitrogen dioxide (NO₂) in the polar stratosphere.**Leader: A.N. Gruzdev. (Institute of Atmospheric Physics Russian Academy of Sciences).****Contact:** a-n-gruzdev@yandex.ru

Aim. Study of features of vertical distribution and time regime of NO₂ in polar regions. Study of effects of changes in solar activity on NO₂.

Basis. Nitrogen oxides (NO, NO₂) play key role in photochemical balance of atmospheric ozone. In the polar lower stratosphere at lower temperature, heterogeneous chemical reactions occur with participation of nitrogen-containing species, which promote significant destruction of ozone by chlorine-containing radicals, resulting in ozone "hole". Therefore, measurements of NO₂ in polar regions are very important.

Another important problem is associated with study of solar activity. The main maximum of nitrogen oxides is located in the stratosphere. At high geomagnetic and solar activity, intensive production of nitrogen oxide is possible in the polar mesosphere and upper stratosphere, due to penetration of energetic charged particles into the earth atmosphere. This problem is still studied insufficiently.

Anticipated results. Vertical profiles and column abundances of NO₂, characteristics of temporal variability of NO₂ in polar regions, in comparison with data for temperate latitudes. Effects of solar activity on vertical profiles and column abundances of NO₂.

Main kinds of investigations. Spectrophotometer measurements of NO₂ by zenith-scattered solar radiation in spectral range 435-450 nm. The method of NO₂ observations used in IAP allows obtaining NO₂ vertical profiles in the stratosphere and the troposphere.

For theoretical study of solar activity effects, 2-D and 3-D models will be used.

Time, place, and resources of field works. NO₂ abundance will be measured at 3 stations: (1) in NH temperate latitudes – at Zvenigorod Research Station of IAP RAS (56 N, 37 E); (2) In the northern polar region – at station of Lovozero (68 N, 35 E) of PGI RAS; (3) at Antarctic station of Novolazarevckaja (71 S, 12 E). Measurements will be done with similar instruments.