

BELARUS

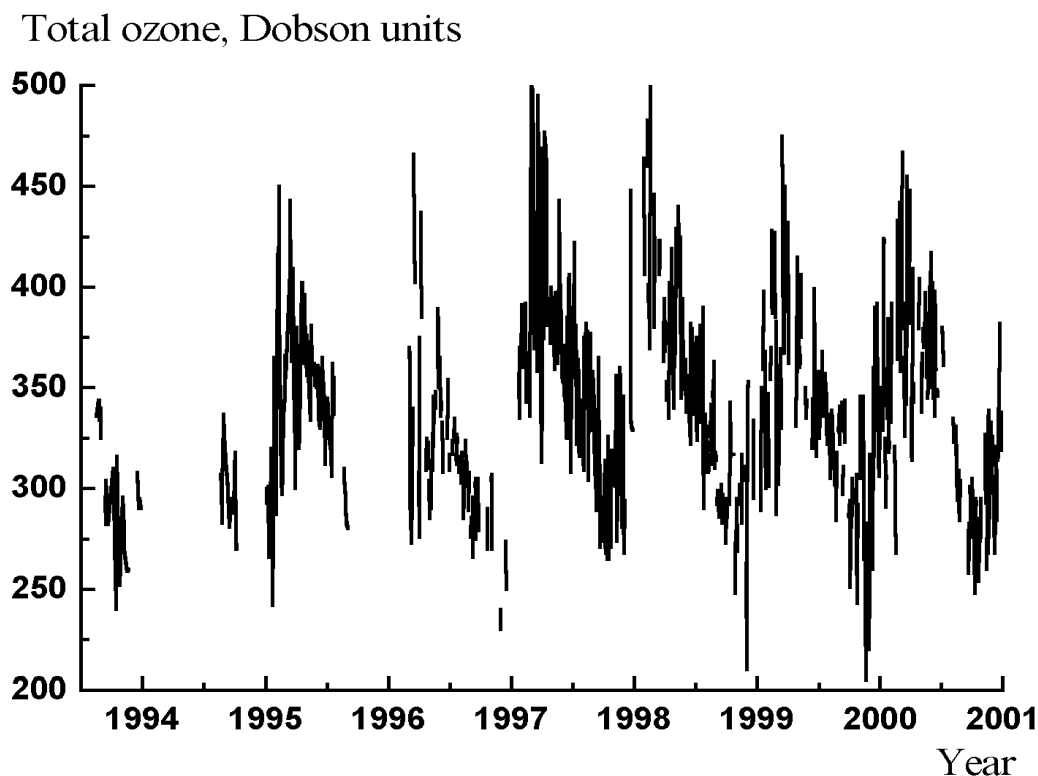
In recent years, institutions in Belarus have carried out a number of activities relating to ozone research and monitoring, in response to decisions taken by the Fifth Meeting of the Conference of the Parties to the Vienna Convention. The National Assembly adopted the Law of the Belarus Republic for Ozone Layer Protection. The National Environmental Monitoring System (NEMS), together with the Atmosphere Ozone Monitoring subsystem, was also established, and a plan for the development of the subsystem up to 2005 has been prepared. The government department responsible for atmospheric ozone research and monitoring is the Ministry of Natural Resources and Environmental Protection.

OZONE AND UV MONITORING

Total ozone measurements are carried out at a station located in Minsk at the National Ozone Monitoring Research & Educational Center (NOMREC), which is affiliated to Belarus State University. The Station coordinates are (53.833N, 27.469E). Its WO₃UDC identification number is 354. Experimental total ozone measurements started in 1995 with the universal solar ultraviolet spectrometer-ozonometer PION, constructed at Belarus State University. The device contains a small size double grating monochromator. In 1996, the PION was intercompared with a WMO regional standard (Dobson N 108 spectrometer) in St.-Petersburg (Russia). The last recalibration made in August 2001 showed high stability of the instrument parameters.

Regular Total Ozone Monitoring has been carried out in Minsk since March 1997. The data are submitted to the World (Canada) and CIS (Russia) data centers, as well as to the Belarus mass media. The results of total ozone measurements at the Minsk station are presented in Figure 1.

Fig. 1. Total ozone, Dobson units (N 354 station, Minsk).



Regular observations of horizontal ultraviolet irradiance in the spectral range 285-450 nm have been carried out with the portable UV spectroradiometer PION-UV (developed by NOMREC) since September 2001. The fully automated instrument PION-UV has a double holographic grating

monochromator with 0.8 nm resolution and a stray light reduction of $1 \cdot 10^{-6}$ degrees, with a cosine for-optics system. It is a completely hermetic and temperature stabilized construction. The monthly monitoring of instrument parameters and calibration is carried out through a specially created testing procedure certified by the State Standard Agency, in accordance with WMO guidelines. Regular Lidar vertical ozone profiles and aerosol monitoring was started at the Institute of Physics of the National Academy of Science (IPNAS) in 1999, in accordance with NEMS standards. Figure 2 shows the vertical distribution of ozone concentrations during 1999 – 2001.

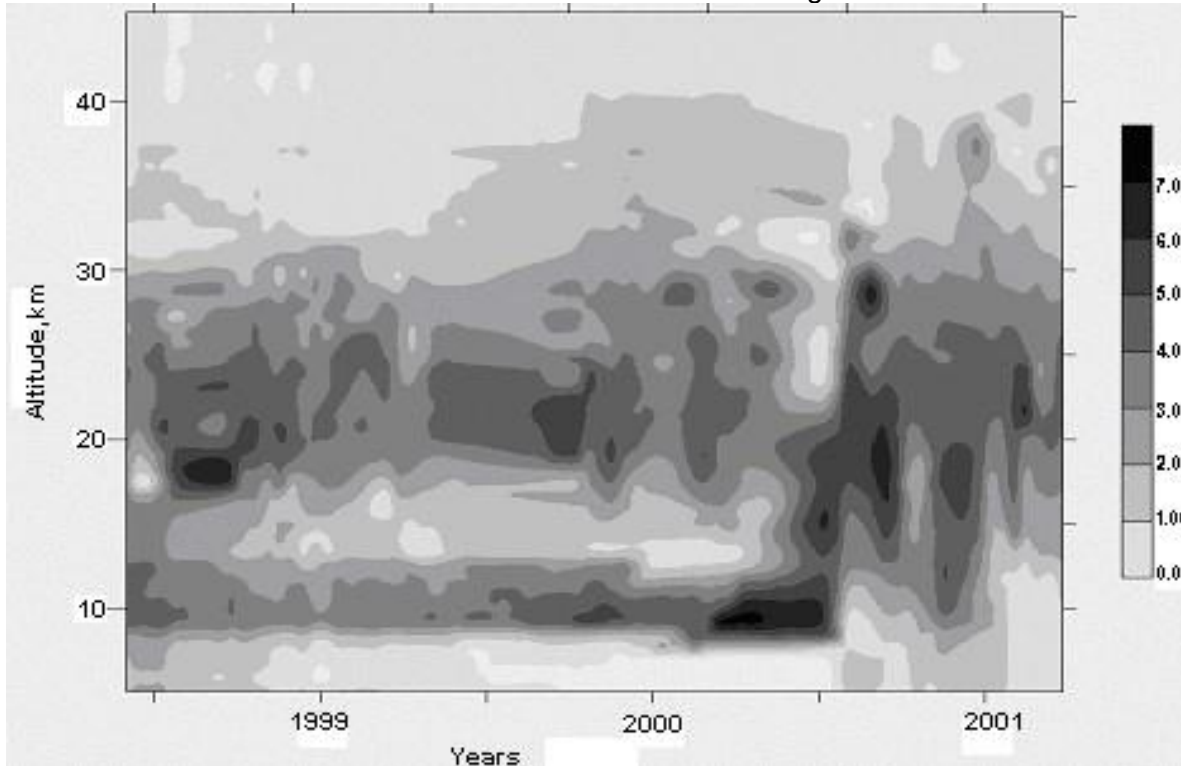


Fig. 2. Time dependence of ozone concentration structures during 1999 - 2001 above Minsk ($n_{oz} \cdot 10^{-12} [\text{cm}^{-3}]$).

Planned activities

The Belarus Sanitary & Hygiene Research Institute (BSHRI), in cooperation with NOMREC, plans to start monitoring the effects of changed ultraviolet irradiation on human health next year.

In accordance with a decision taken at a regional NDSC meeting held in Moscow (October, 2001), nitrogen oxide NDSC standard measurements will be introduced in the region with the assistance of the Obukhov Atmosphere Physics Institute (Russia).

There are also plans to set up a meteorological base for a future surface ozone network, and to conduct surface ozone observations at the NOMREC station.

In 2003, NOMREC will start providing UV index forecasts, working with a public awareness company.

Ongoing and planned research activities

Improvements are being made to the total ozone and UV horizontal irradiance monitoring equipment, along with its maintenance. A self-calibration procedure for the control of total ozone equipment parameters and correction between intercomparisons is being developed. An Umkehr method for vertical ozone profile measurements will be implemented at the Minsk Ozone Station.

Software has been developed for automated mode measuring of solar UV spectral irradiance and daily doses of different biologic effects (erythema and DNA damage). The algorithm provides an optimal mode of measurement of observations under changing conditions throughout the whole day.

There are plans to analyse total ozone distribution and climatic phenomena intercorrelations over Europe, in particular, the impact of interseasonal ozone holes on the energy balance of the atmosphere.

NOMREC, in co-operation with BSHRI, has developed a methodology for the estimation of ultraviolet radiation sources. Work is also in progress to improve UV-index forecasting techniques.

IPNAS, in co-operation with the European EATLINET Lidar network, has carried out research into atmospheric aerosol transfer processes above the European region. The influence of dust from the Sahara desert, eruptions of the Etna volcano, forest fires in the USA and other natural and anthropogenic factors affecting atmospheric characteristics have been studied. In 2002, an experimental Lidar network for aerosol monitoring among the CIS countries is expected to begin operation. This activity will be carried out in close collaboration with EATLINET.
