

**REPORT OF THE REPUBLIC OF LITHUANIA  
PURSUANT TO ARTICLE 9 OF THE MONTREAL PROTOCOL ENTITLED  
"RESEARCH, DEVELOPMENT, PUBLIC AWARENESS AND EXCHANGE OF  
INFORMATION"**

For the years 2014–2015

In accordance with the Parties' obligations under Article 9 "Research, development, public awareness and exchange of information" of the Montreal Protocol, the Republic of Lithuania has prepared a report on activities performed in 2014–2015 pursuant to this Article.

This report contains information on:

- Observational and research activities related to stratospheric ozone and UV monitoring;
- Promoting of public awareness.

**I. OBSERVATIONAL AND RESEARCH ACTIVITIES RELATED TO STRATOSPHERIC OZONE AND UV MONITORING**

Lithuania has been a party to the Vienna Convention for the Protection of the Ozone Layer since 1994. The Montreal Protocol on Substances that Deplete the Ozone Layer and its subsequent London, Copenhagen, Montreal and Beijing amendments were ratified accordingly in 1997 and 2004. The Regulation (EC) No. 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer and relevant national legislation implements the Montreal Protocol in Lithuania. The Regulation No. 1005/2009 is broader in scope than the Protocol in several areas, such as its schedules to phase out ozone depleting substances and provisions on products and equipment. Lithuania does not produce any ozone depleting substances. The majority of ozone depleting substances has been phased out in the consumption sector in Lithuania since the ratification of the Montreal Protocol in 1997.

Lithuania has been a party to the Convention of Long-range Transboundary Air Pollution since 1993 and its Protocol to Abate Acidification, Eutrophication and Ground-level Ozone since 2004.

Atmospheric ozone and ultraviolet (UV) monitoring is conducted mainly by the Lithuanian Hydrometeorological Service under the Ministry of Environment of Republic of Lithuania (LHMS). Atmospheric ozone and UV monitoring is being conducted using the standard observation programme recommended by the World Meteorological Organization for hydrometeorological services.

Total column ozone and ultraviolet measurements are carried out at Kaunas and Palanga meteorological stations:

<i>Station</i>	<i>Location</i>	<i>UV-A</i>	<i>UV-B</i>	<i>Total column ozone</i>
Kaunas	54°53'N, 23°50'E	X	X	X
Palanga	55°58'N, 21°06'E		X	

### **Column measurements of ozone and other gases/variables relevant to ozone loss**

The state of ozone layer is monitored at Kaunas meteorological station (WMO Index 0-20008-0-KAU), which is located close to the geographical center of Lithuania. Since January 1<sup>st</sup>, 1993, total ozone measurements have been carried out with the M-124 filter ozonometer. Routine measurements of total ozone are made by trained personnel up to nine times per day.

At the end of 2013, Kaunas meteorological station was equipped with Brewer MKIII Spectrophotometer made by Kipp & Zonen. Brewer MKIII Spectrophotometer's data comparison with M-124 Filter ozonometer data is being carried out currently.

### **Profile measurements of ozone and other gasses/variables relevant to ozone loss**

LHMS does not have ozone sondes and ozone lidar to make measurements of ozone profile.

### **UV measurements**

Ultraviolet solar radiation measurements have been carried out in Kaunas and Palanga (by the Baltic Sea) since 2000. Mean and maximum daily radiation is monitored using the UV Biometers type 501 A, version 3 (in Kaunas – UV-A radiation and UV-B radiation, in Palanga – UV-B radiation).

### **Calibration activities**

The network instruments are calibrated according to the national standard at regular intervals.

The M-124 filter ozonometer had previously been calibrated at the Remote Sensing Scientific Research Centre of the Main Geophysical Observatory in St. Petersburg (Russia), every two years. Ozonometers have been calibrated by the LHMS Meteorological Laboratory since 2010.

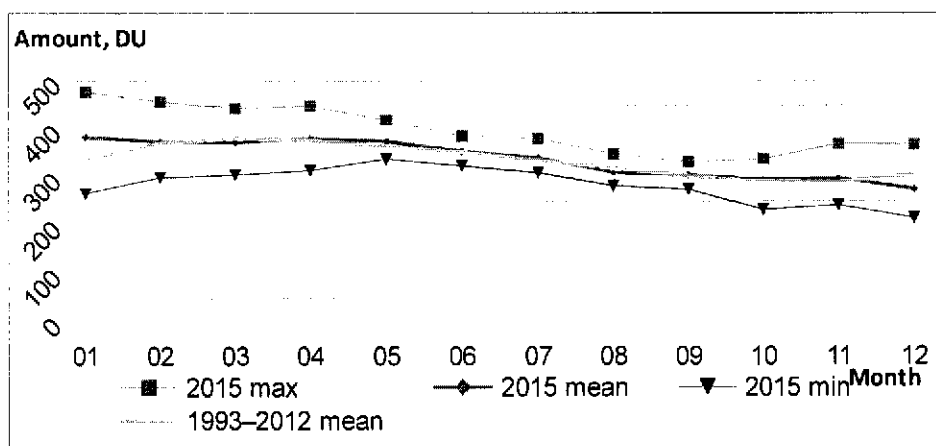
The UV-Biometers have been calibrated by the LHMS Meteorological Laboratory yearly.

At the end of 2010, the Laboratory of Atmospheric Physics of the Thessaloniki University (Greece) performed sensitivity calibration for a standard measuring instrument of LHMS Metrology Laboratory. Following that calibration, Kaunas and Palanga stations' biometers were recalibrated and since January 1<sup>st</sup>, 2011 new recalculated coefficients have been applied to the ultraviolet solar radiation readings.

## **RESULTS FROM OBSERVATIONS AND DATA ANALYSIS**

In 2015, the total amount of atmospheric ozone fluctuated rather significantly. The minimum amount of atmospheric ozone (216 DU) was observed on December 6<sup>th</sup>, 2015 (in 2014 – 245 DU was observed on November 5<sup>th</sup>), and the maximum (478 DU) was measured on January 18<sup>th</sup>, 2015 (in 2014 – 418 DU on March 24<sup>th</sup>). Mean annual amount of the ozone was 339 DU (in 2014 – 334 DU). Comparing with 2014 measurements, in 2015 the total amount of the atmospheric ozone increased by 1.6 % and equalled the normal value (comparing 2014 annual mean with 2013

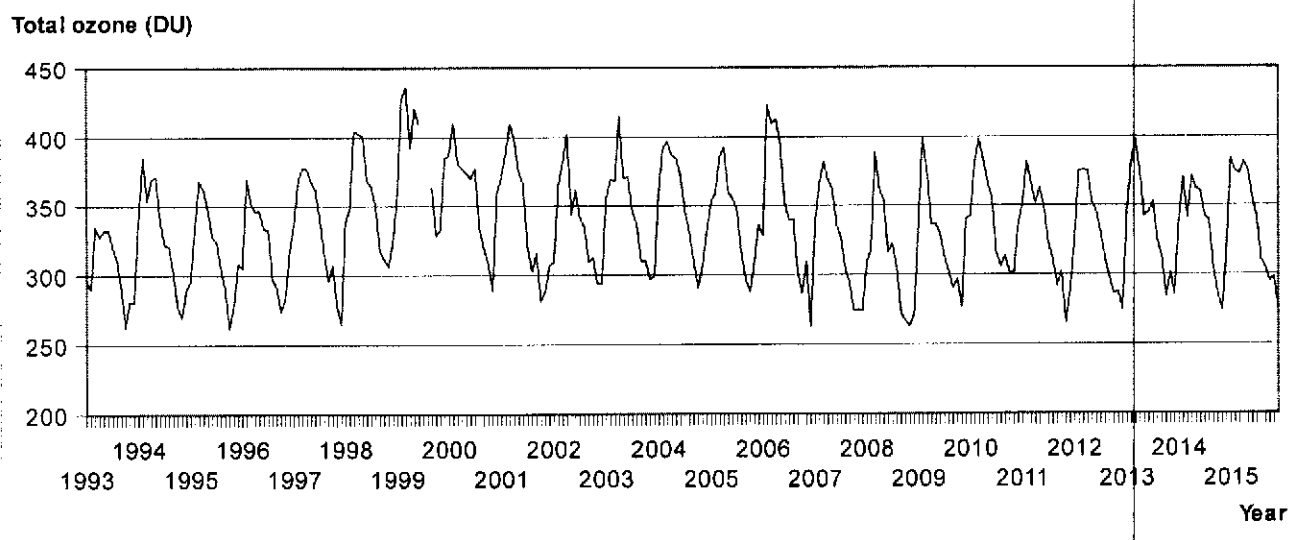
measurements – the result is that the total amount of atmospheric ozone dropped by 1 % and was 0.7 % below the normal value (multi-annual mean).



**Total ozone mean annual cycle**

All observational data are stored and processed on a regular basis. Due to comparatively short series of observations, they are considered insufficient for a comprehensive study.

In 2015, the LHMS carried out the ozone data analysis resulting in establishment of the mean total ozone values for the period of 1993–2012 that have since been used to assess the ozone layer depletion over Lithuania. It is also used in monitoring the ozone column and assessment of its quantitative changes.



**Total ozone fluctuation 1993-2015 (Station N 312, Kaunas)**

The ozone measurement data are sent on a regular basis by LHMS to the World Ozone and Ultraviolet Data Centre (WOUDC) in Toronto (Canada). Since 2004, also the UV-B measurement data from Kaunas station have been sent to WOUDC.

### **Projects and collaboration**

UV index forecast, data from the Human Biometeorology Unit (GF MM) of the German Meteorology Service (DWD) are used with modifications depending on local cloudiness. At present, no international or national projects on the study of ozone are conducted.

## **II. PROMOTING OF PUBLIC AWARENESS**

Being aware that public awareness and exchange of information is important for successful implementation of the Montreal Protocol, relevant European and national legislation, the Government of the Republic of Lithuania considers the awareness rising as one of the priorities.

The Ministry of Environment of the Republic of Lithuania provides interested parties with consultations and explanations on particular ozone depleting substances (ODS) related issues, especially with regard to legal interpretation of the particular provisions of Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer and national legal acts.

During 2014-2015 attention was paid to further improvement of information which is placed on the Internet and is related to ozone depleting issues as well as to ones of ODS containing products and equipment. Several articles on implementation of ODS legislation were newly prepared and uploaded. Two articles were prepared and placed on the Internet (accordingly in November, 2014 and February, 2015) informing that the use of recycled and reclaimed hydrochlorofluorocarbons in the maintenance or servicing of existing refrigeration, air conditioning and heat pump equipment is prohibited from 1<sup>st</sup> January, 2015. Articles also contain information that by the way of derogation from the requirements of the Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer, only certain ozone depleting substances can be used for a further limited period of time, such as halons for critical uses, including, inter alia, on aircrafts.

Lithuania's population is informed about the level of UV radiation in Lithuania and risks related to it. In case of significant ozone layer depletion, LHMS originates warnings, which are disseminated through the mass media and via the Internet ([www.meteo.lt](http://www.meteo.lt)).

Since 2001, LHMS has been providing the UV index forecasts (UVI) for the periods May – August. Since 2008, the forecasting period has been extended for the periods April – September. These forecasts are disseminated through the mass media and via the Internet.

Since 2002, the total ozone values and their changes as well as the ultraviolet solar radiation intensity figures are published in "Status of Environment" annual reports published by the Ministry of Environment of the Republic of Lithuania. The information is also published in "Status of Environment" Fact Sheets annually.

Ultraviolet solar radiation data and their analysis as an environmental and health indicator each year (as well as in 2014 and 2015) are presented to the Health Education and Disease Prevention Centre under the Ministry of Health of the Republic of Lithuania.

The following articles and advisories on the ozone were prepared in 2014-2015:

In November 2015, the article "Larger Annual Antarctic ozone hole" describing Antarctic ozone hole area, which was larger and formed later than in recent years was posted on LHMS website;

In September 2015, the article about the meaning of international ozone day was posted on LHMS website;

In December 2015, the article "Ozone layer changes" describing ozone layer depletion over Lithuania, Central Europe and surroundings areas was posted on LHMS website.

On January 13<sup>th</sup>, 2014, Mr. Sergei Tretyakov, Deputy Head of Vilnius Regional Department of Environmental Protection Agency defended his doctoral thesis "Investigation of total ozone amount and development of its research methods" and was awarded Doctor of Science degree in the field of environmental engineering.

In September 2014, on the occasion of the International Day for the Preservation of the Ozone Layer, the article on the ozone layer protection and ozone depleting substances was prepared and placed on the Internet ([www.bernardinai.lt](http://www.bernardinai.lt)).

Ozone and UV research activities also are carried out at Vilnius Gediminas Technical University and the Institute of Physics. In 2015 the following proceeding was published:

"Outdoor and indoor ozone level – A potential impact on human health" by V. Valuntaitė and R. Girgždienė (Vojnosanit Pregl. Beograd: Institut Vojnomedicinski Dokumentaciju. ISSN 0042-8450. Vol. 72, no 8 (2015).