

LITHUANIA

OBSERVATIONAL ACTIVITIES

Atmospheric ozone and UV monitoring is mainly conducted by the Lithuanian Hydrometeorological Service under the Ministry of Environment (LHMS), which follows the standard programme of observations of the World Meteorological Organization recommendable for hydrometeorological services.

The LHMS carries out column ozone operational measurements and UV measurements at:

Overview of the ozone and UV monitoring locations in Lithuania.

<i>Station</i>	<i>Location</i>	<i>UV-A</i>	<i>UV-B</i>	<i>Total ozone</i>
Kaunas	54°53'N, 23°50'E	x	x	x
Palanga	55°97'N, 21°09'E		x	
Preila	55°20'N, 21°00'E		X	
Aukstaitija	55°26'N, 26°04'E	x	X	

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

The state of ozone layer is monitored at the Kaunas meteorological station (WMO Index 312). Total ozone measurements have been carried out with the M-124 filter ozonometer since 1 January 1993. The Kaunas station is located close to the centre of Lithuania. Routine measurements of total ozone are made (up to a maximum of six times per day) by trained personnel.

Profile measurements of ozone and other gases/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 at Kaunas and Palanga (by the Baltic Sea) since 2000. Mean and maximum daily radiation is monitored using the UVBiometers type 501 A, version 3 (in Kaunas – UV-A radiation and UV-B radiation, in Palanga – UV-B radiation). Continuously ground-level UV radiation is measured at two background monitoring stations: UVB radiation at Aukstaitija and Preila by SKU430 UV-B (280-315 nm), the global solar radiation is monitoring by the Pyranometer sensor SKS1110 (500-1000 nm).

Calibration activities

The network instruments are calibrated against the National Standard at regular intervals, every two years.

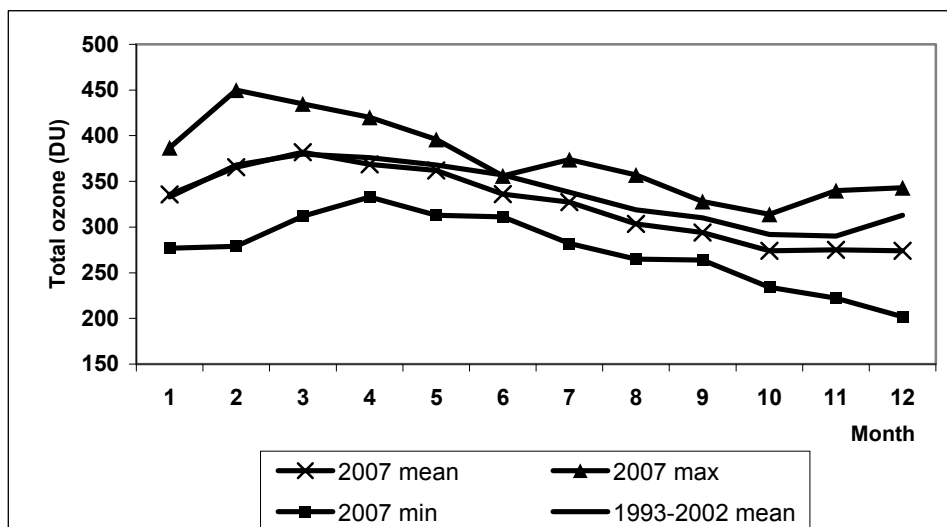
The M -124 filter ozonometer is calibrated every two years at the Remote Sensing Scientific Research Centre of the Main Geophysical Observatory in St Petersburg, Russia. The last calibration was carried out in 2006.

The UV-Biometers have been calibrated by the LHMS Metrological Laboratory in 2007.

RESULTS FROM OBSERVATIONS AND DATA ANALYSIS

In 2007, the total amount of atmospheric ozone fluctuated quite significantly. The minimum amount of atmospheric ozone (about 202 DU) was observed in December, and the maximum (about 450

DU) was measured in 16 February. Mean annual amount of the total ozone was 351 DU. Comparing with 2006 measurements, the total amount of atmospheric ozone remained practically the same.



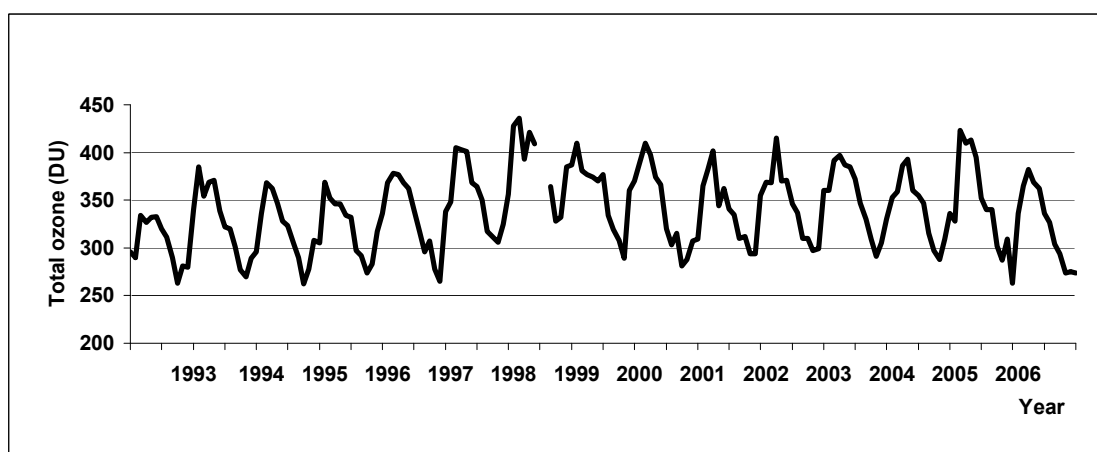
Total ozone mean annual cycle

THEORY, MODELLING, AND OTHER RESEARCH

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.

The Lithuanian total ozone climatology, based on available data, was published in 2001 as a completed study titled "Ozone In the World and In Lithuania".

In 2003, the LHMS Meteorology Division carried out the ozone data analysis resulting in establishment of the mean total ozone values for the period of 1993 – 2002 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 1993–2007 (N 312 station, Kaunas).

Ozone and UV research activities are carried on in the Vilnius Gediminas Technical University and Institute of Physics. The relationship between UVB radiation intensity and the total and ground-level ozone under low polluted Lithuanian rural conditions was studied and the influence of the changeable UV radiation on the ground-level ozone concentration was investigated (*Chadysiene et*

al., 2008). The continuous measurements of ground-level ozone are carried out at 4 background Lithuanian stations.

DISSEMINATION OF RESULTS

Data reporting

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

Information to the public

In case of significant ozone layer depletion, the LHMS originates warnings disseminated through the mass media and over the Internet.

Since 2001, the LHMS Meteorology Division has been originating the UV index forecasts (UVI) for annual periods of May – August. These forecasts are disseminated through the mass media and Internet.

Since 2002, the total ozone values and their change as well as the ultraviolet solar radiation intensity figures are published in the State of the Environment annual reports issued by the Ministry of Environment of the Republic of Lithuania.

Relevant scientific papers

Chadysiene R., R. Girgzdiene and A. Girgzdys, Relationship of total ozone amount, UV radiation intensity, and the ground-level ozone concentration at rural Lithuanian sites. Lithuanian Journal of Physics, 48, 1, 99-106, 2008.

Chadyšienė R., Girgždienė R., Girgždys A., Ultraviolet radiation and ground-level ozone variation in Lithuania. J. of Environmental Engineering and Landscape Management, 13, 1, 31-36. ISSN 1648-6897, 2005.

PROJECTS AND COLLABORATION

Establishment of the UV monitoring network in Lithuania was supported by the Italian – Lithuanian Counterpart Fund. The Polish Institute of Meteorology and Water Management assisted LHMS in application of the UV Index forecasting model.

At present no international and national projects on study of ozone are conducted.

FUTURE PLANS

- Observations of the ozone layer and the UV radiation will be continued.
- It is planned to purchase and install of equipment for monitoring regularly total ozone, ozone vertical distribution, surface ozone.
- To make a research on impact of UV-B on human health and eco-systems.
