

CZECH REPUBLIC

According to recommendations of the Fourth Meeting of the Ozone Research Managers of the Parties to the Vienna Convention. Geneva 1999 summarized in its Report, mainly in the Decision V/3, the following activities on monitoring and research of atmospheric ozone are being carried out and planned in the Czech Republic.

1. MONITORING

Monitoring of the atmospheric ozone and related parameters (e.g. UV solar radiation) are performed at specialized observatories of the Czech Hydrometeorological Institute (CHMI) as a contribution of CHMI to the Global Atmosphere Watch Program (GAW) of the World Meteorological Organization (WMO). The following monitoring programs have been implemented in CHMI.

Total Ozone

Long-term daily observations of total ozone have been performed at the Solar and Ozone Observatory of CHMI in Hradec Kralove (SOO-HK) with the Dobson spectrophotometer D074 since 1962 and with the Brewer spectrophotometer B098 since 1994. Both instruments are regularly calibrated every 2-4 years towards world and regional standards. Since 1999 D074 has been maintained as a secondary reference instrument for the RA-VI region. Total ozone measurements are stored in the ozone database at SOO-HK and are regularly submitted in monthly reports to the World Ozone and UV Data Center of WMO (WOUDC), Toronto and to several cooperating stations in Europe. More information is available at:

<http://www.chmi.cz/meteo/ozon/hk-e.html>

Vertical profiles of ozone

Vertical distribution of ozone in the atmosphere is measured with the balloon-borne ozone sondes at the Aerological Observatory (AOPH) of CHMI in Praha. Since 1992 the ECC sondes have been launched three times per a week in January - April. The vertical profiles measured and processed with the Vaisala DigiCora facility are submitted in the real time to the Regional Ozone Sounding Center at NILU, Norway. The final results are stored in the ozone database of CHMI and they are also deposited in the WOUDC, Toronto.

UV-B Solar Radiation

Spectroradiometric measurements of the global UV-B solar radiation are performed with the Brewer single monochromator B098 for different Solar Zenith Angles (SZAs) at SOO-HK every day since 1994. The scans are stored in the UV data base at SOO-HK and are used for calculation of actual values of the UV-Index daily presented for the public by mass media during the summer season. Doses of the erythemally weighted UV-B radiation are measured also with broad-band UV-Biometers at SOO-HK and GAW Observatory Kosetice since 1995. All the instruments are regularly calibrated and UV data are checked by a QA system before they are deposited in the data base and submitted to partners institutions.

2. RECENT AND ONGOING RESEARCH PROJECTS

The following ozone and UV research projects were carried out in the recent years or are being performed in CR at the present.

Development and Implementation of Technologies for the European Ozone Calibration Center

A research project supported by the Grant Agency of CR carried out at SOO-HK in 2001-2003. The main goals of the project are investigation of calibration histories of Czech ozone spectrophotometers, development and construction of technical facilities and software tools for participation of SOO-HK in tasks of the Regional Dobson Calibration Center of the RA-VI (Europe) – see the section International co-operations.

THESEO and MATCH Projects

Research projects on investigation of stratospheric dynamics and their impacts in ozone changes over Arctic and sub-Arctic regions. The campaigns are supported by EC and by many national institutions. CHMI takes part in these campaigns mainly by a real-time submission of vertical ozone profiles measured at the AOPH, Prague.

COST-713 Action - UVB Forecasting

An international project organized by the European Commission (EC) in 1996-2001 under the Cooperation in Science and Technology Program. The main outputs were development and implementation of technologies for forecasting of the UV-Index in participating 12 European countries including CR and its presentation to the public. Also a system for real-time ftp exchange of the UVB observations among COST-713 participants has been created and tested. More information on the COST-713 project can be found at: <http://159.213.57.69/uvweb/index.html>

3. FUTURE PROJECTS

In coming years Czech specialists plan to take part in several ozone and UV research projects established under the 5th Framework Programme of EC. These are:

CANDIDOZ – Chemical and Dynamical Influences on Decadal Ozone Change

The project starts in April 2002. CHMI together with the Department of Atmospheric Physics of the Czech Academy of Sciences will participate as members of the Consortium. Relation between total ozone observations performed with different techniques, long-term consistency of the data base at SOO-HK and estimation of trends of total ozone in Central Europe are the main tasks of the Czech team in the project.

EDUCE – European Database for UV Radiation Climatology and Evaluation

This research project started in 2000 and it continues in previous works carried out under the project SUVDAMA focussed mainly on creation of a European spectroradiometric UV data base. Specialists from SOO-HK are going to join the EDUCE project based on invitation of the research team in June 2002. Deposition of UV measurements and reconstruction of historical changes of the UVB radiation in the territory of CR during last 40 years are the main tasks of the Czech participants in the project.

4. INTERNATIONAL CO-OPERATIONS

WMO-GAW Ozone Programme

For a long time observatories of CHMI take part in the ozone part of the WMO/GAW Programme. These activities which are planned to be continued in the future cover mainly the following scopes:

- Calibration of instruments

Specialists from SOO-HK take part as invited experts in realization of WMO sponsored intercomparisons of ozone spectrophotometers. This includes also repairs and adjustments of the Dobson instruments

- Creation of software tools

Special software products have been developed at SOO-HK and provided to GAW stations for processing and telecommunication transfer of total ozone observations.

- Co-ordination of GAW ozone stations

Experts from SOO-HK contribute in maintenance and co-ordination of the Dobson part of the global GAW ozone network. This includes mainly activities of the Dobson Ad-Hoc Committee and maintenance of the Dobson Web Pages located created at SOO-HK and located at the server of CHMI: <http://www.chmi.cz/meteo/ozon/dobsonweb/welcome.htm>

- Training of the Dobson operators

CHMI in co-operation with WMO carries out a training program for operators of ozone spectrophotometers from stations located in developing countries. The training courses include also implementation of new software tools created at SOO-HK and donated by CHMI to the GAW programme. 32 Dobson operators and managers of 21 ozone stations (see the figure below) were trained by experts of CHMI either at SOO-HK or at missions in the period 1996-2001. More information can be found at:

<http://www.chmi.cz/meteo/ozon/dobsonweb/training.htm>

The Regional Dobson Calibration Center of RA-VI

A cooperation of SOO-HK with the Regional Dobson Calibration Center of RA-VI (RDCC Europe) located at the Meteorological Observatory of the German Meteorological Service at Hohenpeissenberg (MOHP) successfully continues. Regular calibration campaigns held every year at MOHP play a key role in the maintenance of the ground-based network for monitoring of the ozone layer in Europe. Czech specialists contribute to RDCC campaigns mainly by technical assistance in adjustments and repairs of calibrated instruments and in training of operators for new stations.

The SCIAMACHY Validation project

Observatories of CHMI have been invited to contribute to the SCIAMACHY Validation project implemented by the European Satellite Agency (ESA) in 2002. Total ozone observations and vertical profiles of ozone measured at SOO-HK and AOPH will be provided for operational validation of ozone observations performed with the SCIAMACHY satellite system launched by ESA

WOUDC Ozone Mapping Center

Since 2000 SOO-HK submits every day near-real time total ozone data measured in Hradec Kralove to the MSC/WOUDC Mapping Center in Toronto. These observations contribute as input data for creation of daily maps of geographical distribution of total ozone (thickness of the ozone layer) over the Northern Hemisphere.


