



# Ozone layer study over Kyiv by Dobson spectrophotometer measurements

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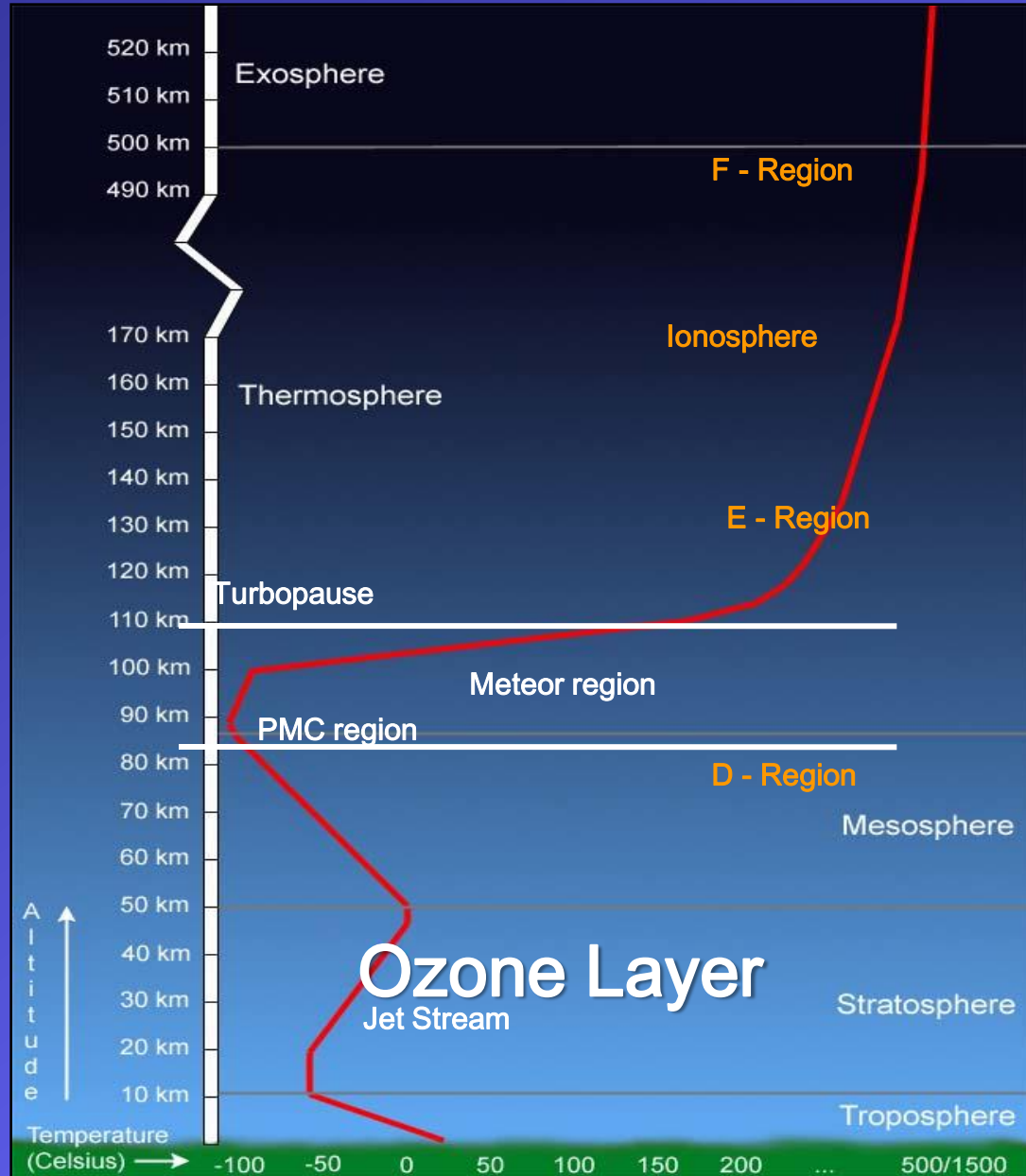
Main Astronomical Observatory of NAS of Ukraine, Kyiv

[genmilinevsky@gmail.com](mailto:genmilinevsky@gmail.com)

# Outline:

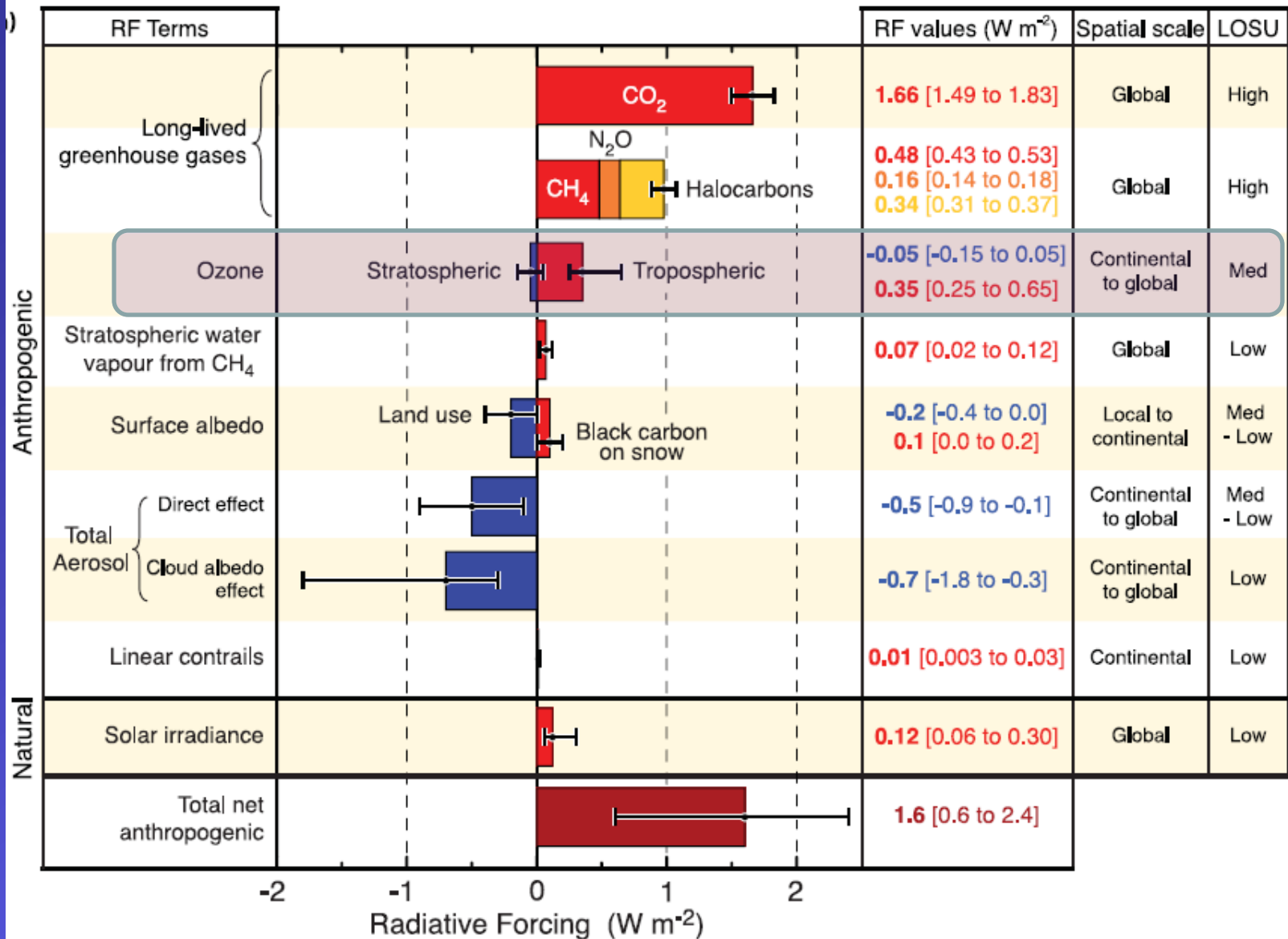
1. Introduction, GAW Program and WOUDC
2. Ozone observations in Ukraine
3. KNU – RMI (MOH/WMO/SOO) Initiative
4. Intercalibration and training
5. Kyiv-Goloseyev site installing
6. Dobson observations in Ukraine
7. Ozone data development, Umkehr data
8. Conclusions

# Atmosphere structure



# Ozone and Climate, IPCC 2007

## GLOBAL MEAN RADIATIVE FORCINGS



©IPCC 2007: WG1-AR4

# 1. Introduction, GAW Program and WOUDC

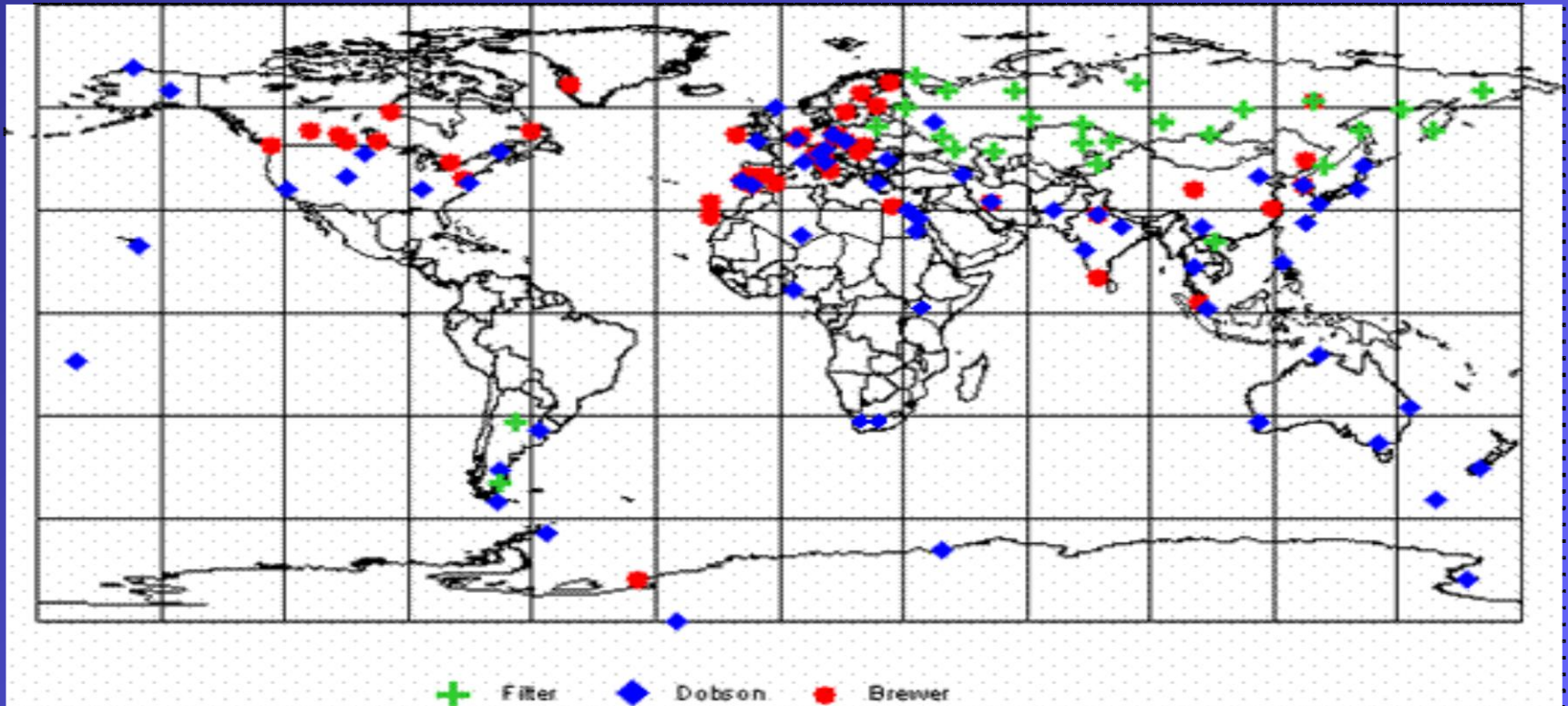
## Global Atmosphere Watch, WMO





# Total ozone observations in GAW

(stations regularly contributing to WOUDC, 2004)



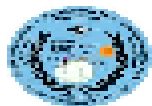
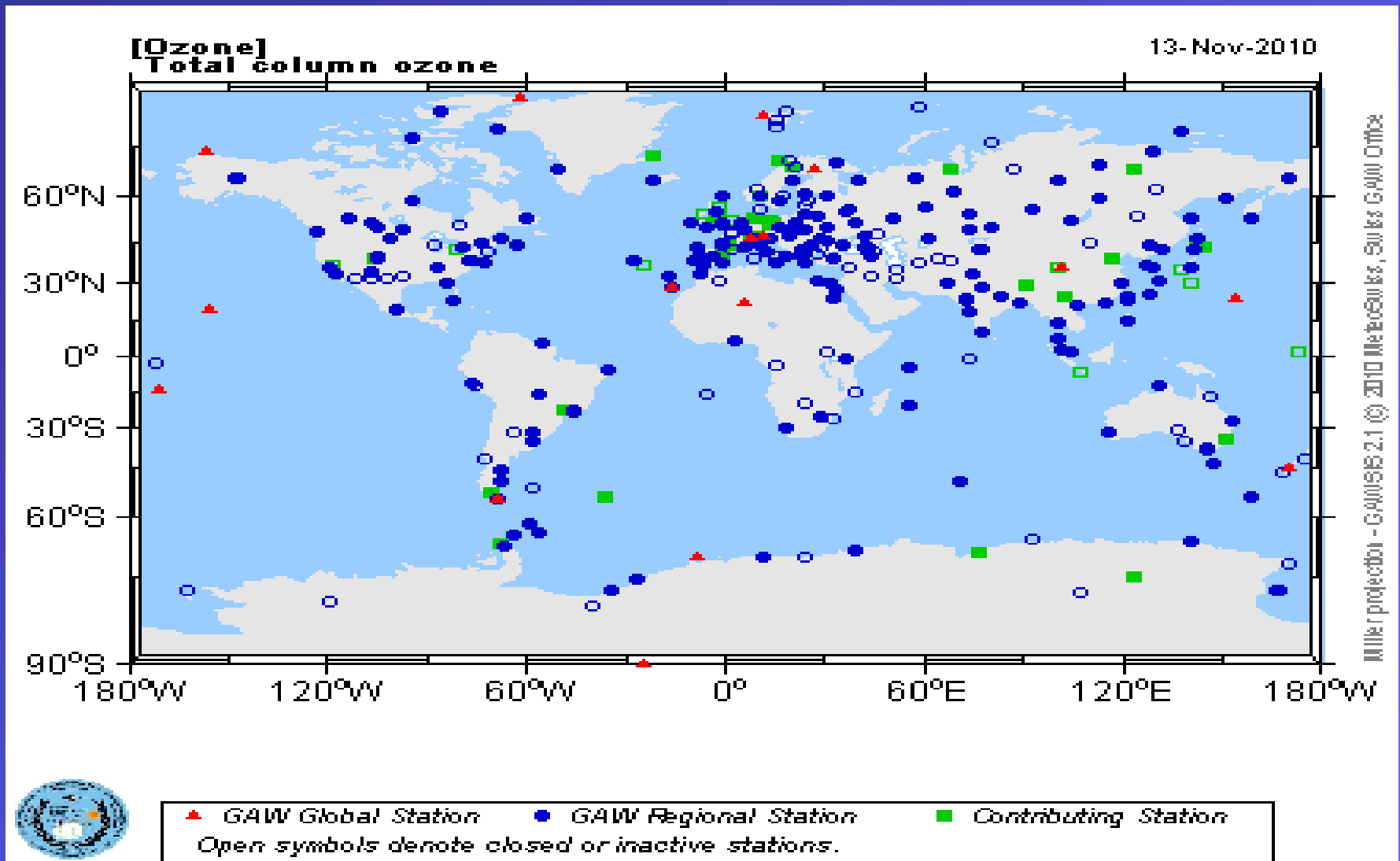
Instruments	Total produced	Depositing after 1996
Brewer	185	62
Dobson	117	75
Filter M-124	63	38
<b>All</b>	<b>365</b>	<b>175</b>

**For details visit:**

<http://www.empa.ch/gaw/gawsis/>

<http://www.woudc.org/>

# Total ozone GAWSYS stations



<http://gaw.empa.ch/gawsis/>

# Calibration Campaigns at RDCCs

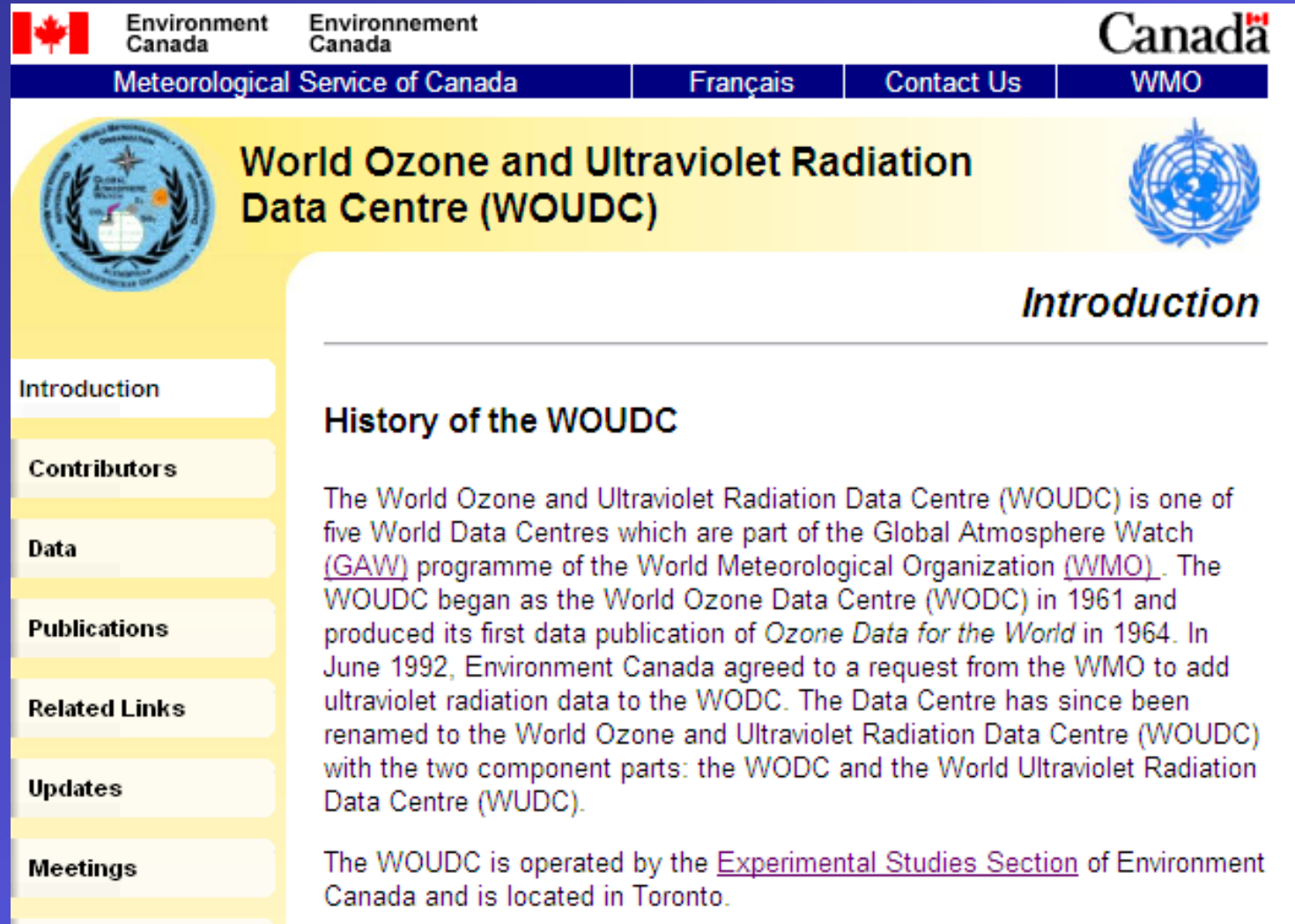
**Pacific**

*Melbourne, Australia*







# Data - World Ozone and Ultraviolet Radiation Data Centre (WOUDC)



The screenshot shows the top navigation bar with logos for Environment Canada, Environnement Canada, and the Canadian flag. Below this is a dark blue bar with links for 'Meteorological Service of Canada', 'Français', 'Contact Us', and 'WMO'. The main header area is yellow and features the WOUDC logo on the left, the title 'World Ozone and Ultraviolet Radiation Data Centre (WOUDC)' in the center, and the WMO logo on the right. A vertical sidebar on the left contains a menu with items: 'Introduction', 'Contributors', 'Data', 'Publications', 'Related Links', 'Updates', and 'Meetings'. The main content area is white and titled 'Introduction' in italics. It contains a section 'History of the WOUDC' with a paragraph of text and a link to the 'Experimental Studies Section'.

Environment Canada Environnement Canada

Meteorological Service of Canada Français Contact Us WMO

 **World Ozone and Ultraviolet Radiation Data Centre (WOUDC)** 

*Introduction*

**History of the WOUDC**

The World Ozone and Ultraviolet Radiation Data Centre (WOUDC) is one of five World Data Centres which are part of the Global Atmosphere Watch (GAW) programme of the World Meteorological Organization (WMO). The WOUDC began as the World Ozone Data Centre (WODC) in 1961 and produced its first data publication of *Ozone Data for the World* in 1964. In June 1992, Environment Canada agreed to a request from the WMO to add ultraviolet radiation data to the WODC. The Data Centre has since been renamed to the World Ozone and Ultraviolet Radiation Data Centre (WOUDC) with the two component parts: the WODC and the World Ultraviolet Radiation Data Centre (WUDC).

The WOUDC is operated by the [Experimental Studies Section](#) of Environment Canada and is located in Toronto.

[http://www.woudc.org/introduction\\_e.html](http://www.woudc.org/introduction_e.html)

## 2. Ozone observations in Ukraine

Исследования озонового слоя в Украине проводились с помощью фильтровых озонметров типа М-83/М-124 под эгидой ГГО в нескольких районах: на станциях Феодосия, Одесса, Львов, и станции Киев в 1973–98 гг. (по данным WOUDC).

В настоящее время в России работают несколько спектрофотометров Добсона (Москва с 1991 г., Санкт-Петербург) и спектрометров Брюера (Обнинск с 1993 г., Кисловодск с 1989 г.).

Регулярные измерения ОСО в Беларуси на озонметрической станции в г. Минск ведутся с 1996 г. с помощью солнечного озонметра-спектрофотометра (<http://www.nomrec.bsu.by/russian.html>).

По данным (Осадчий и др., 2010) измерения озона в озонметрической сети Украины проводились и до 2008 г., однако результаты этих измерений в центре WOUDC отсутствуют. Есть данные наблюдений только до 1998 г. по различным станциям Украины.

### 3. KNU – RMI (MOH/WMO/SOO) initiative

В апреле 2010 года в результате переговоров с Королевским метеорологическим институтом Бельгии был получен спектрофотометр Добсона D040 от для организации регулярных наблюдений ОСО в Украине.

# 4. Intercalibration and training



Solar and Ozone observatory, Hradec Kralove, Czech Republic

Global and regional climate change, Kyiv, November 16-18, 2010

G.Milinevsky



# Интеркалибровка спектрофотометра Добсона D040 по эталонному прибору D074 в СОО, Градец Кралове





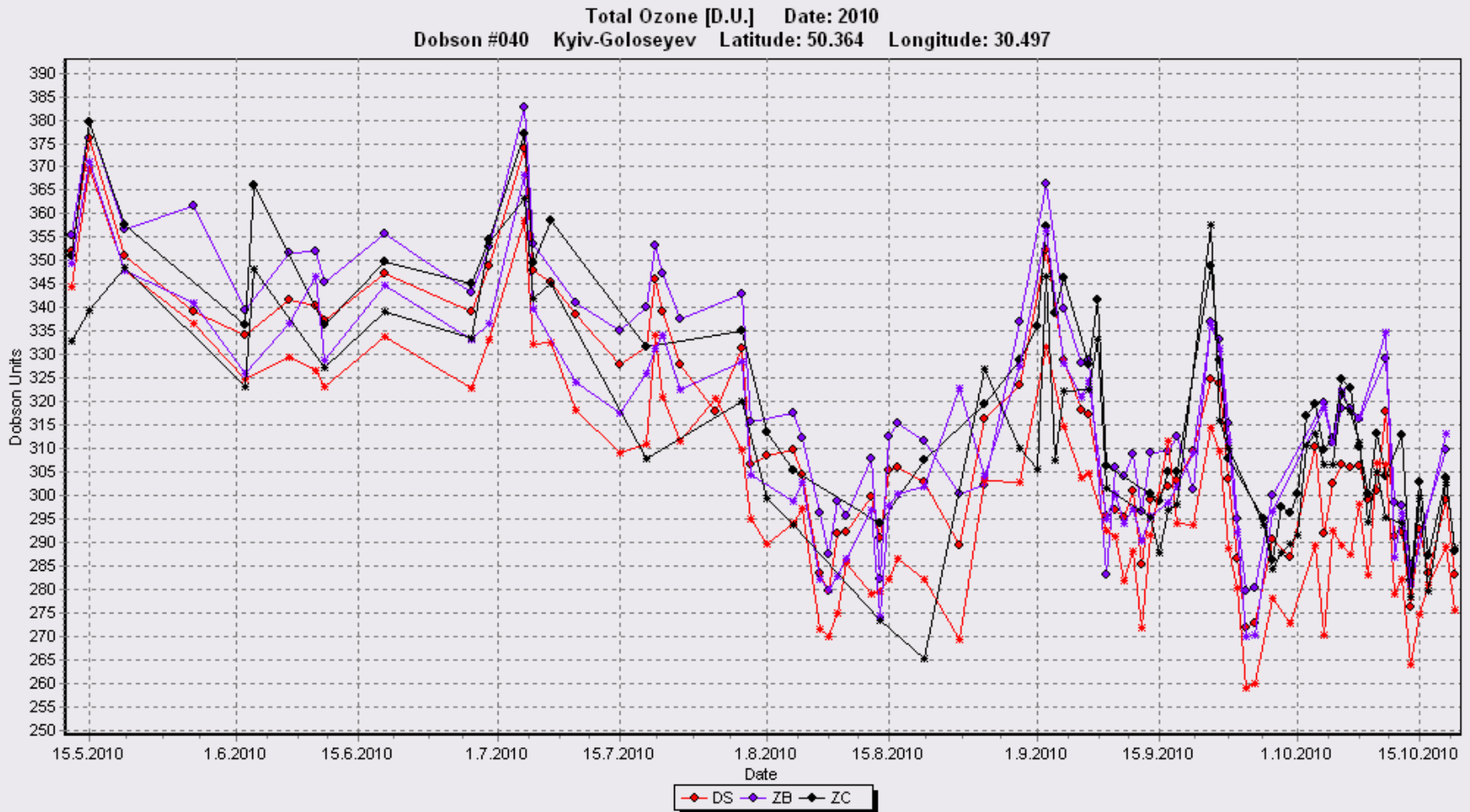
## 5. Kyiv-Goloseyev site installing



Наблюдения общего содержания озона с помощью спектрофотометра Добсона D040 в Киеве были начаты 13 мая 2010 года в новом пункте наблюдений "Киев-Голосеево".

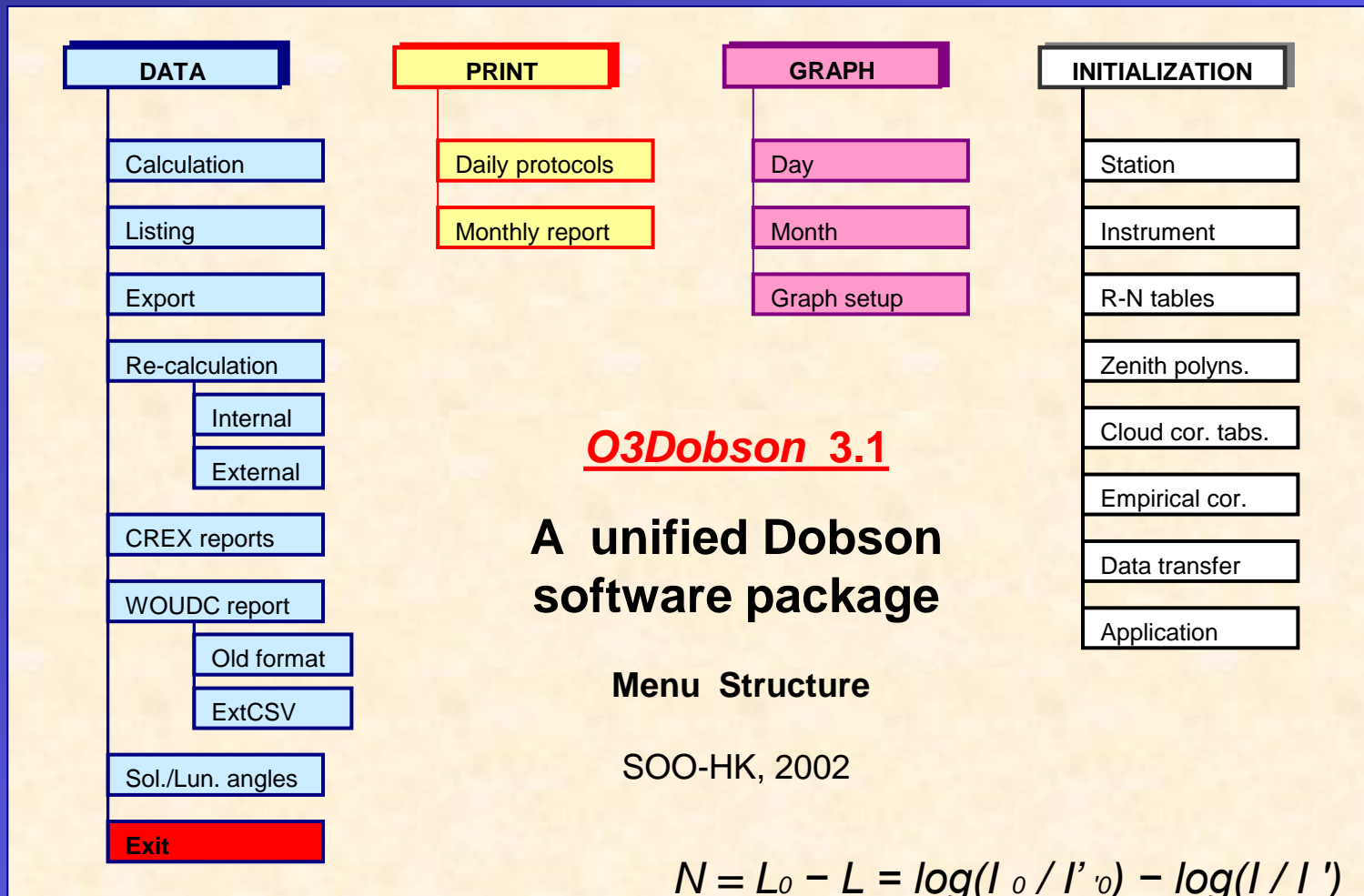
# 6. Dobson observations in Ukraine

May-October 2010: AD CD calculations DS, ZB, ZC

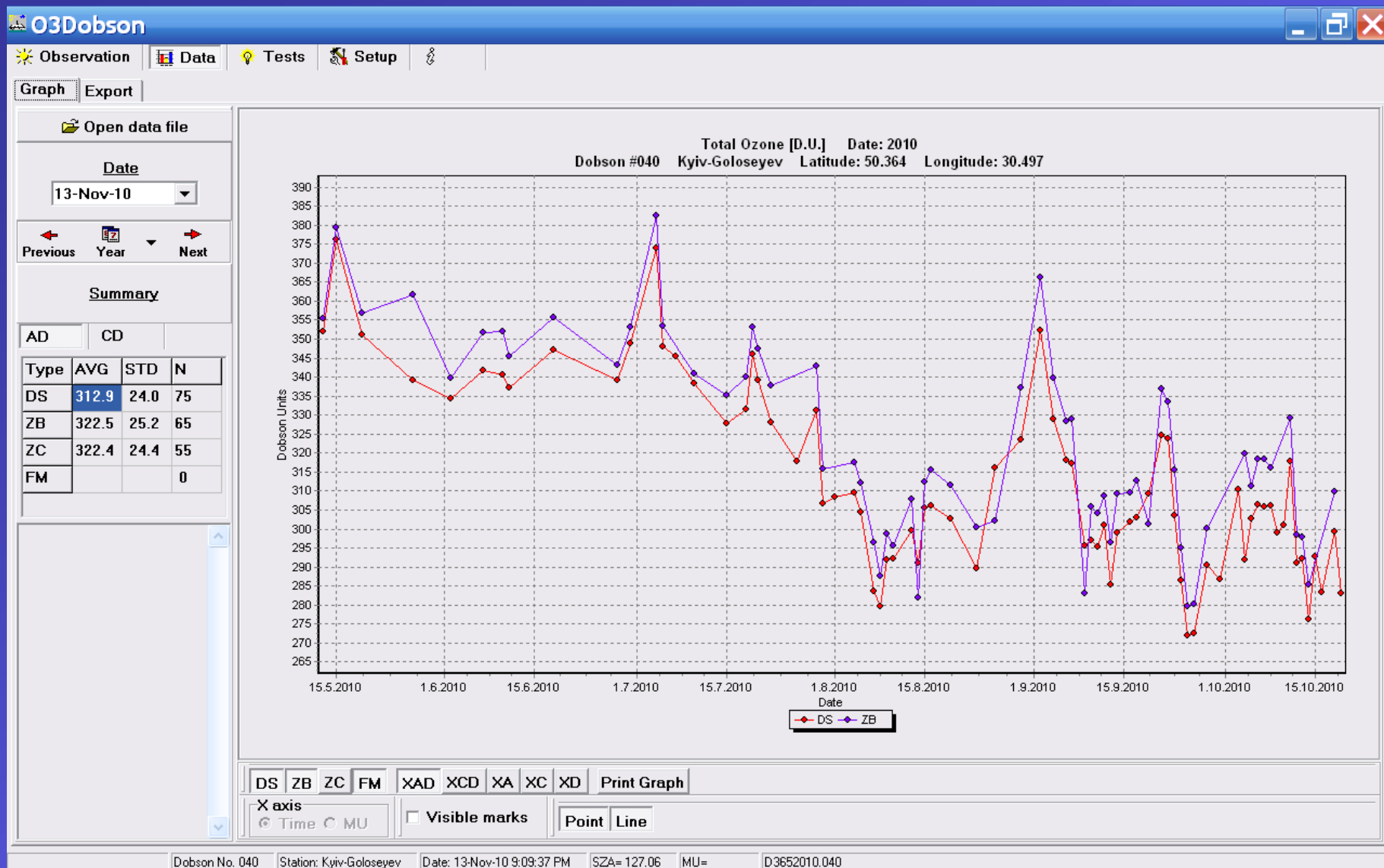


# 7. Ozone data development, Umkehr data

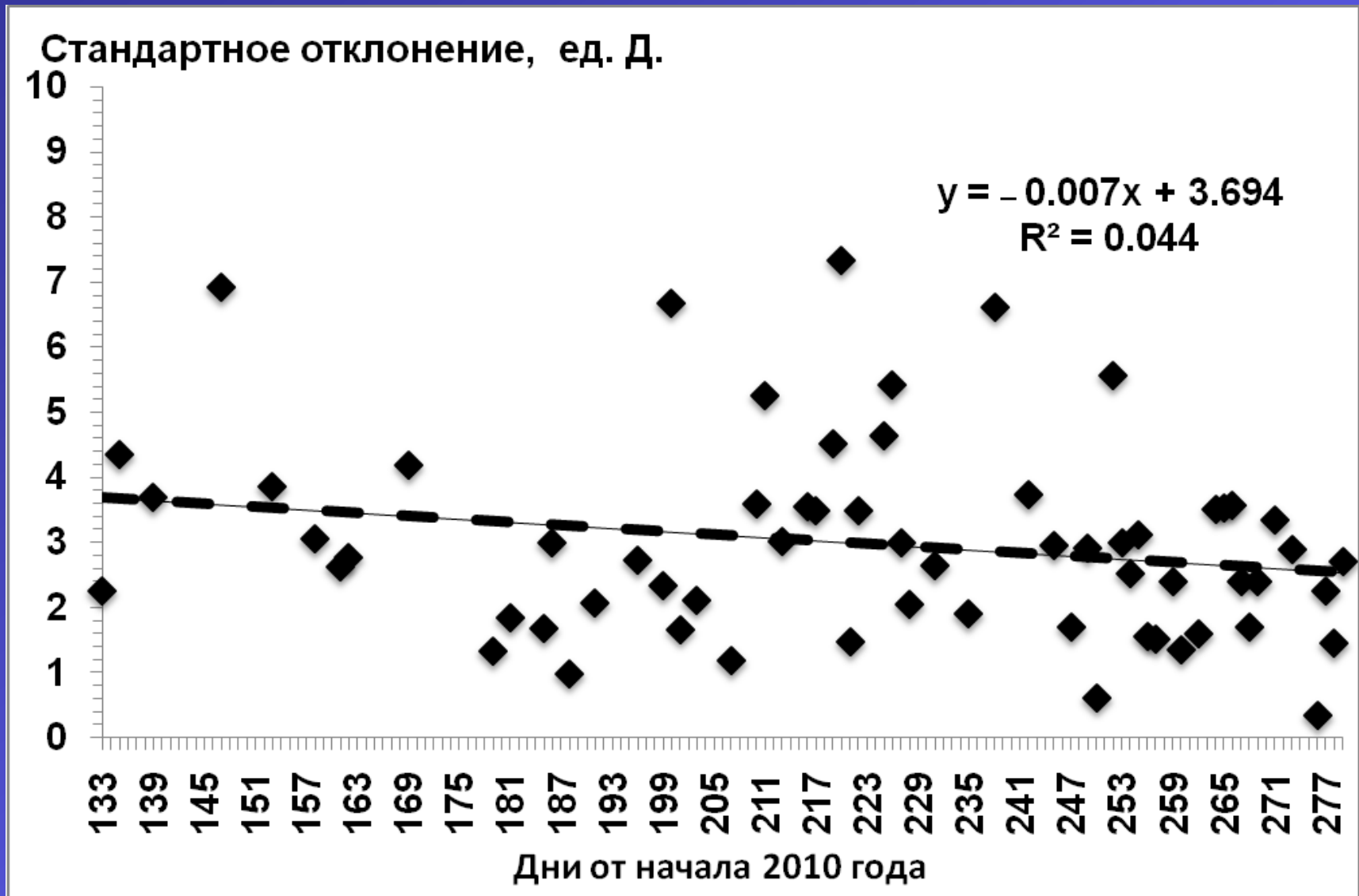
By Martin Stanek SOO-HK, Czech Republic



# O3Dobson software: DS and ZB data



# Standard deviation for TOC values



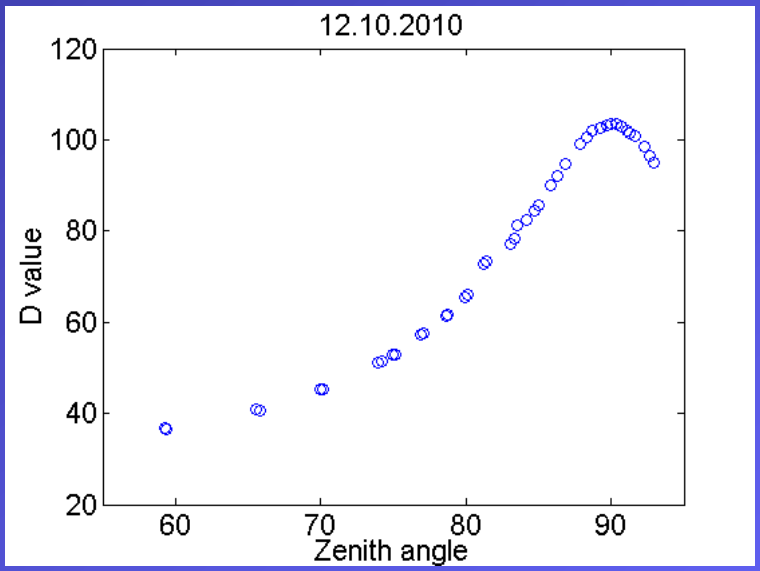
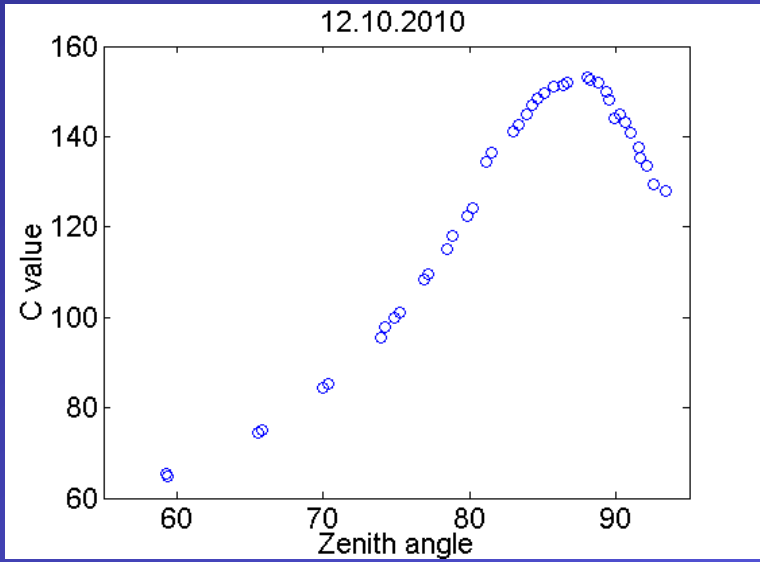


## Accuracy of measurements: 2.4 DU

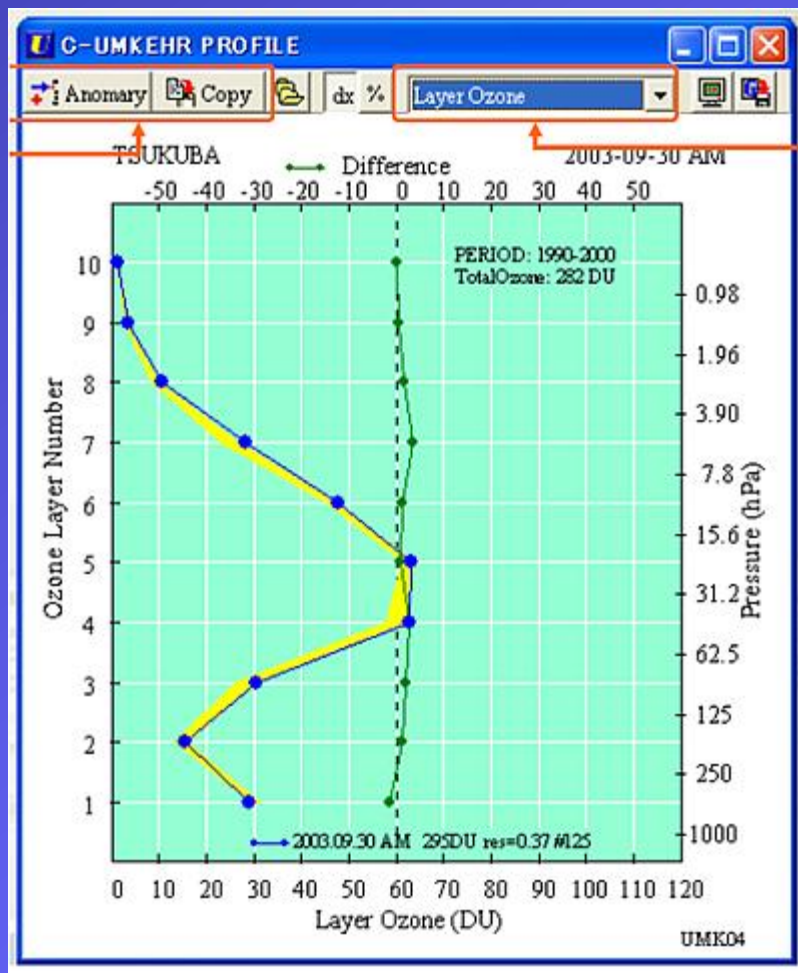
Отклонение измерений ТОС прибора D040 при сравнении с эталонным прибором D074 при стандартных AD-DS наблюдениях в парах длин волн А и D составляет **−0.8%** ТОС, что соответствует 2.4 ед. Д. в диапазоне  $Mu$  1.15 – 3.2

# Umkehr – ozone height profile reconstruction

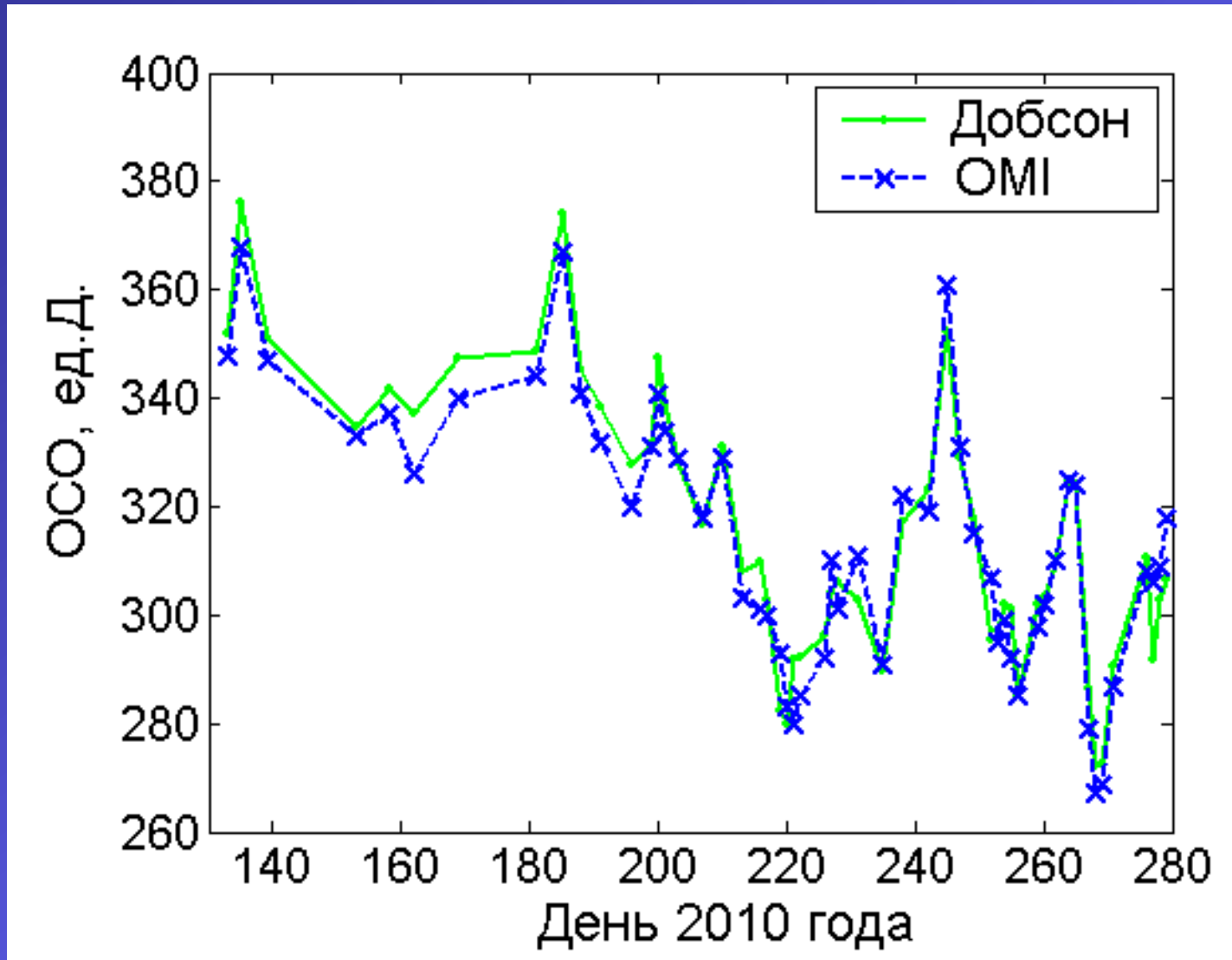
## Measurements D040



## Calculations, Windobson



# Dobson 040 – OMI (Aura) comparison



# Conclusions

1. Total ozone measurements have been started in Ukraine first time
2. Ukraine became ozone data contributor country
3. Work continuously!
4. Where are data?

# WOUDC Station Kyiv-Goloseyev, Ukraine



Environment  
Canada

Environnement  
Canada

Canada

Meteorological Service of Canada

Français

Contact Us

WMO



## World Ozone and Ultraviolet Radiation Data Centre (WOUDC)



### Agency Observation Programs

Introduction

Contributors

Data

Publications

Related Links

Updates

Meetings

Documentation

Software

**Agency:** KNU

Kyiv National Taras Shevchenko University

**Address:** Head of Space Physics Laboratory of Kyiv National Taras Shevchenko University

64, Volodymyrska Str.

01601, Kyiv

UKRAINE

**Contact:** This information is available by request to the WOUDC.

[Link to Agency Revisions Summary](#)

<a href="#">Platform</a>	<a href="#">Name</a>	<a href="#">Category</a>	<a href="#">Instrument</a>	<a href="#">S/N</a>	<a href="#">Model</a>	<a href="#">Min. Date</a>	<a href="#">Max. Date</a>
<a href="#">STN 498</a>	KYIV-GOLOSEYEV	TotalOzoneObs	Dobson	040	Beck	13-May-10	30-Sep-10
<a href="#">STN 498</a>	KYIV-GOLOSEYEV	TotalOzone	Dobson	040	Beck	01-May-10	30-Sep-10



Look at: <http://antarctica.org.ua/ozone.html>

ABOUT SITE



## Ozone monitoring

### Kyiv-Goloseyev site

WOUDC Dobson spectrophotometer observations



### Gentoo Penguin Chick at Petermann Island

Photo by [Gennadi Milinevsky](#). View full-size photo [here](#).



### Ozone monitoring at Kyiv-Goloseyev site

#### Responsibility

The **Kyiv-Goloseyev** ozone monitoring site with the Dobson ozone spectrophotometer D040 has been established by Kyiv National Taras Shevchenko University (KNU) in collaboration with the Main Astronomical Observatory (MAO) NAS of Ukraine.

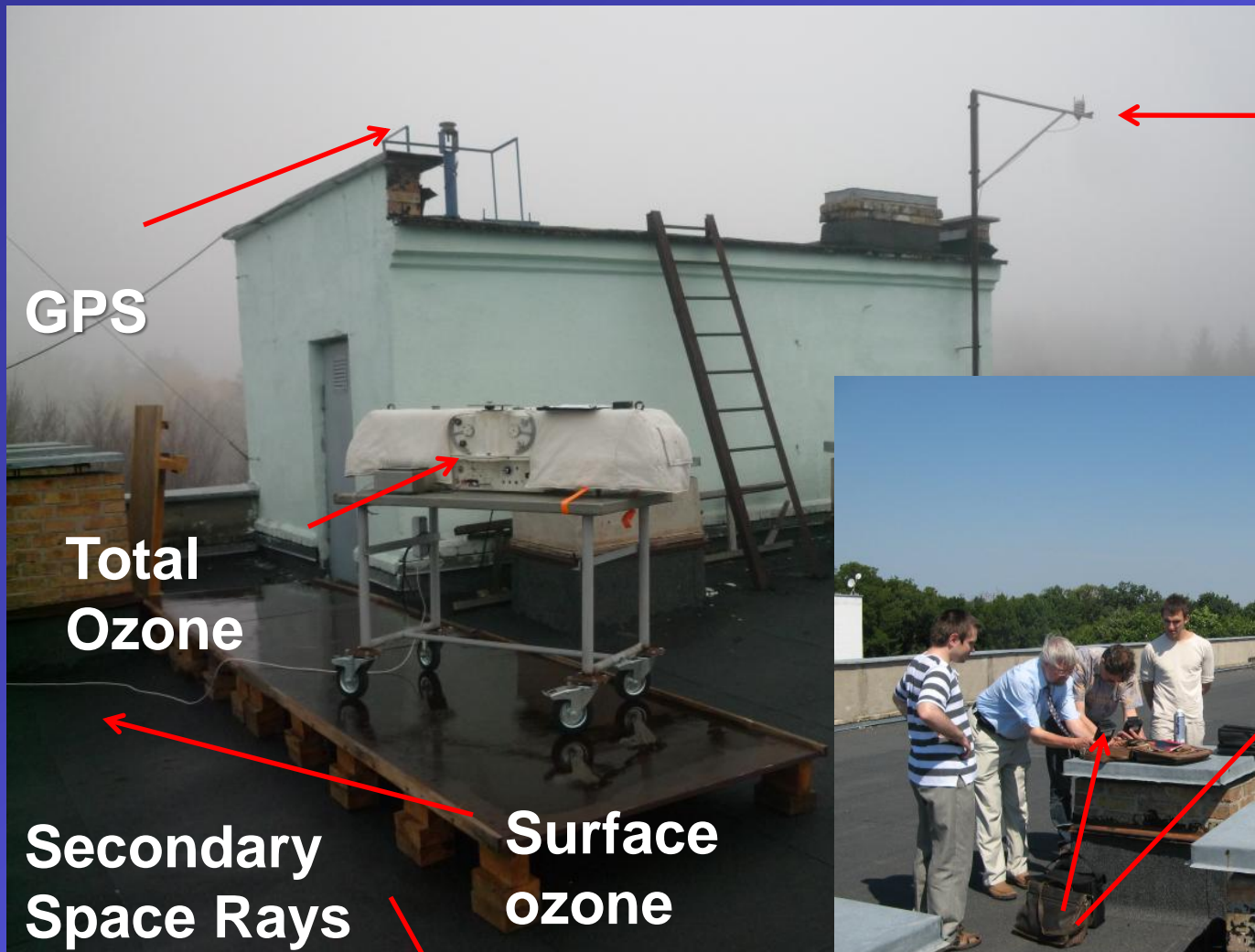
The scientific team in charge of atmospheric chemistry observations at the site: Space Physics Laboratory of KNU and Laboratory for Atmospheric Optics of MAO included 7 scientists total, who joined in the United Laboratory of Atmospheric Optics and Aerosol of KNU and MAO.

#### Navigation

Kyiv-Goloseyev site

- [Ozone monitoring site](#)
- [Site description](#)
- [Daily data](#)
- [Month data](#)
- [Year data](#)

# Atmosphere research and monitoring site KNU-MAO



# Development

From:



To:

*The Fully Automated Dobson System, JMA, Tsukuba*



*Thank You!*