

ESACII Mid-term meeting

September 4, 2003

BIRA-IASB Brussels

Status of the long term ozone and UV observations at KMI-IRM

Hugo De Backer

Overview

Monitoring

- ozone
- UV

Forecasting of UV index

New Studies

- secondary ozone maxima
- aerosol AOD in UVB

Valorisation

- archiving & data exchange (local and international)
- meetings/publications
- dissemination of forecasted UV index

Monitoring - Ozone

Brewer spectrophotometers (since 1983)

New double Brewer (#178) in use since September 2001

Initial problems:

- low signal/noise ratio for ZS observations (caused by the wrong orientation of a polarisation filter)
- difference of 5-10% with Brewer 016

Recalibration of Brewers #016 and #178 May 2003

- mainly #016 needs adjustment
- backward corrections need to be implemented

Dobson spectrophotometer (since 1971)

Last calibration May 2000, seems to be stable

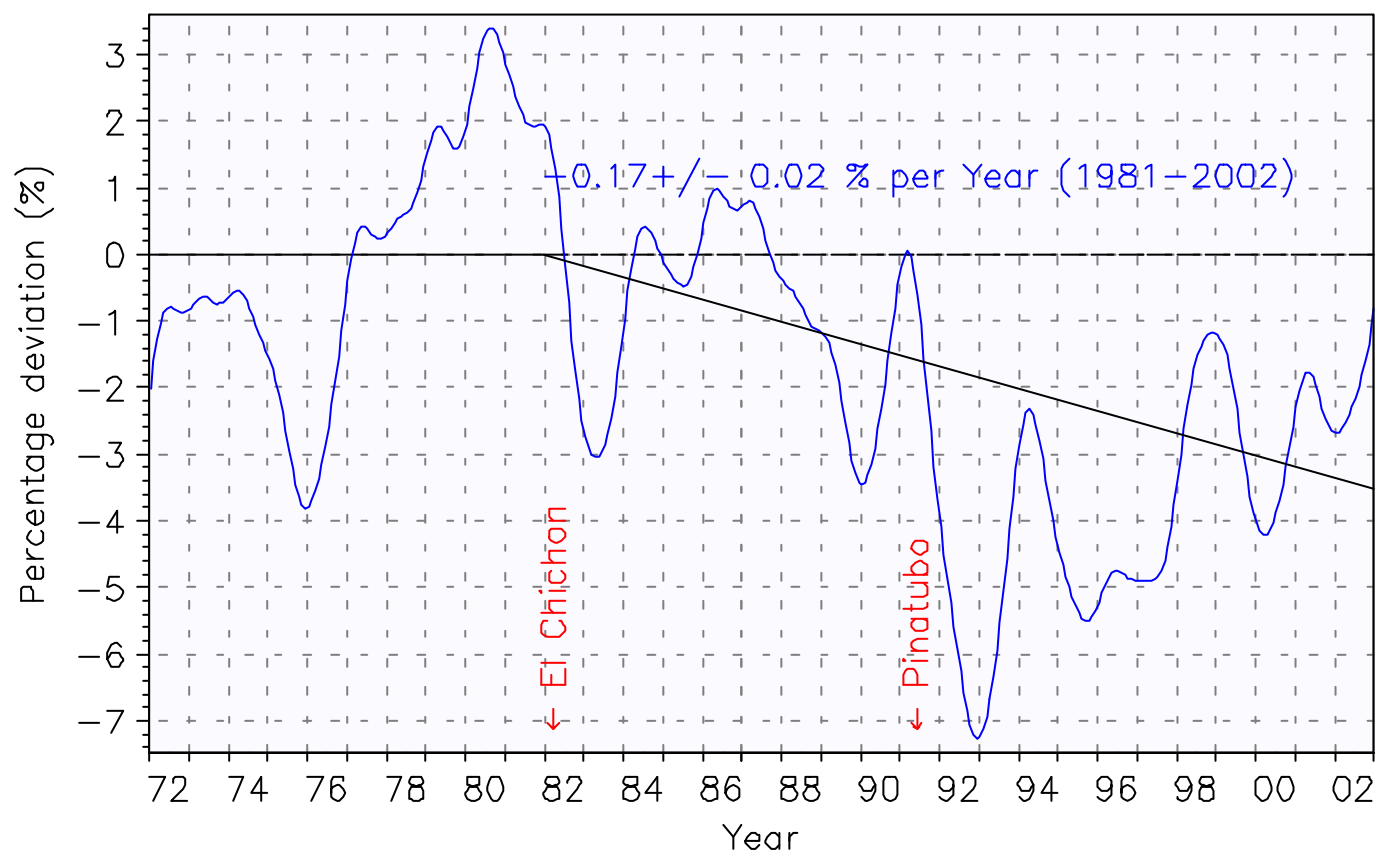
Balloon ozone soundings (since 1969)

program of 3 soundings per week continues

additional soundings were performed for validation of ENVISAT products

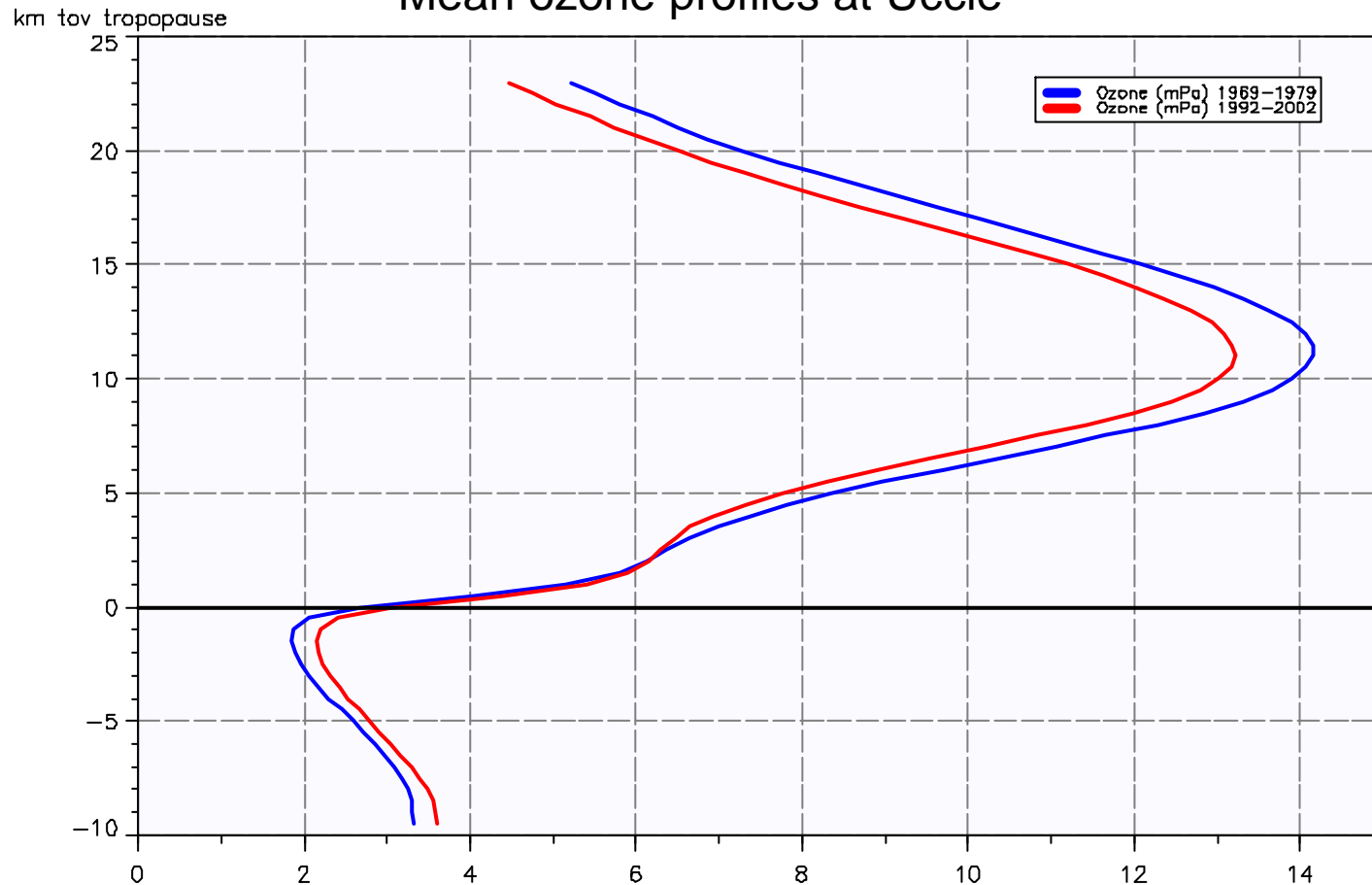
Monitoring - Ozone

Total ozone time series from Dobson #40 at Uccle



Monitoring - Ozone

Mean ozone profiles at Uccle



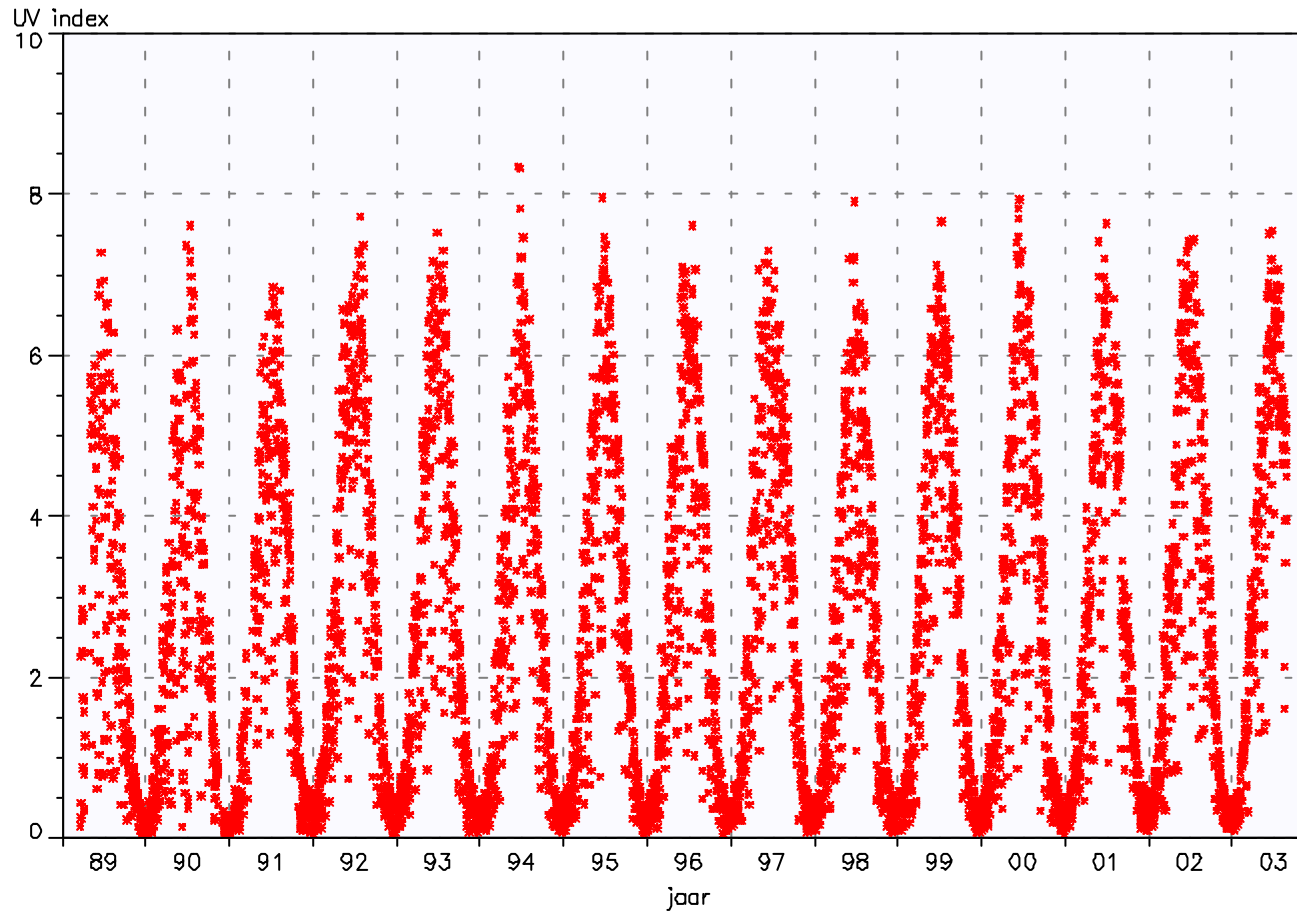
Monitoring - UV

Brewer spectrophotometers

- Brewer #016 measures UVB spectra (290-325 nm) since 1989
- Brewer #178 measures UVB + part of UVA spectra (286.5-363 nm) since Sep 2001
- Monthly calibration check with small lamps
- Calibration with NIST traceable lamps during calibration campaign of the Brewer instruments in May 2003:
 - Only very small differences (<2.5% and <1.5% for #016 and #178 respectively)

Monitoring - UV

Time series of UVI at noon at Uccle



Forecasting UV index

Daily forecast of UV index for clear sky

Radiative transfer model (TUV)

Input:

- ephemerides

- forecasted ozone column (statistical multiregression)

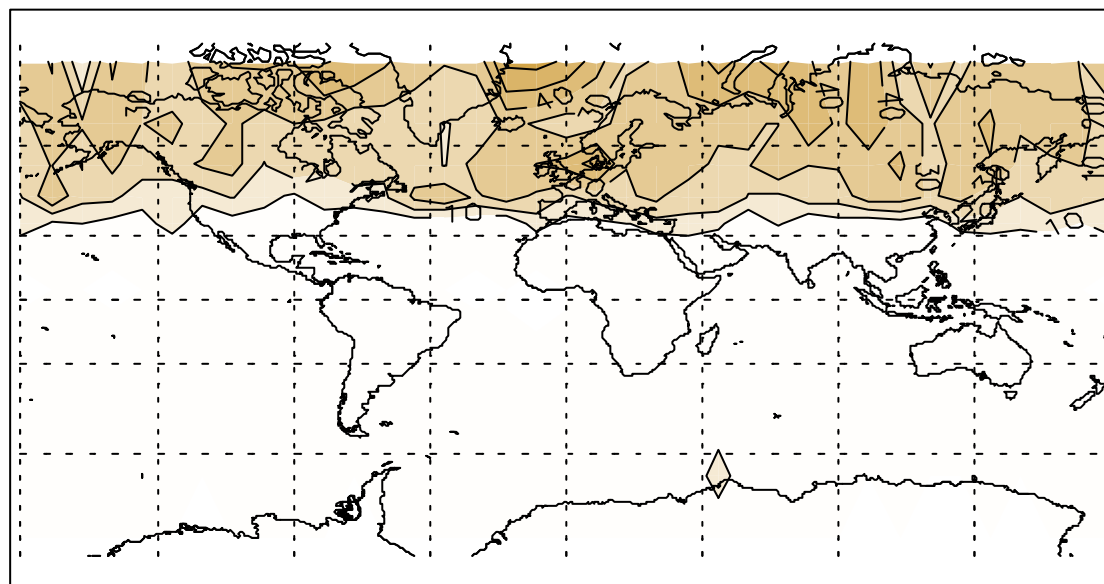
- observed ozone profile (scaled to column)

Disseminated with weather forecasts

New studies - Secondary ozone maxima

Based on ozone soundings at Uccle and SAGE II profiles

Example: geographical distribution of secondary ozone maxima in profiles obtained with SAGE II (1985-2000). Values are percentage of profiles with secondary maximum during the months March, April and May.



New studies - Aerosol optical depth (UVB)

Development of algorithm to derive AOD from Brewer observations.

More information in the presentation by A. Cheymol

Valorisation

Local archiving:

- in original files
- in Oracle relational database
 - easy connection with other meteorological data and accessible by other users at the institute

International archiving & data exchange:

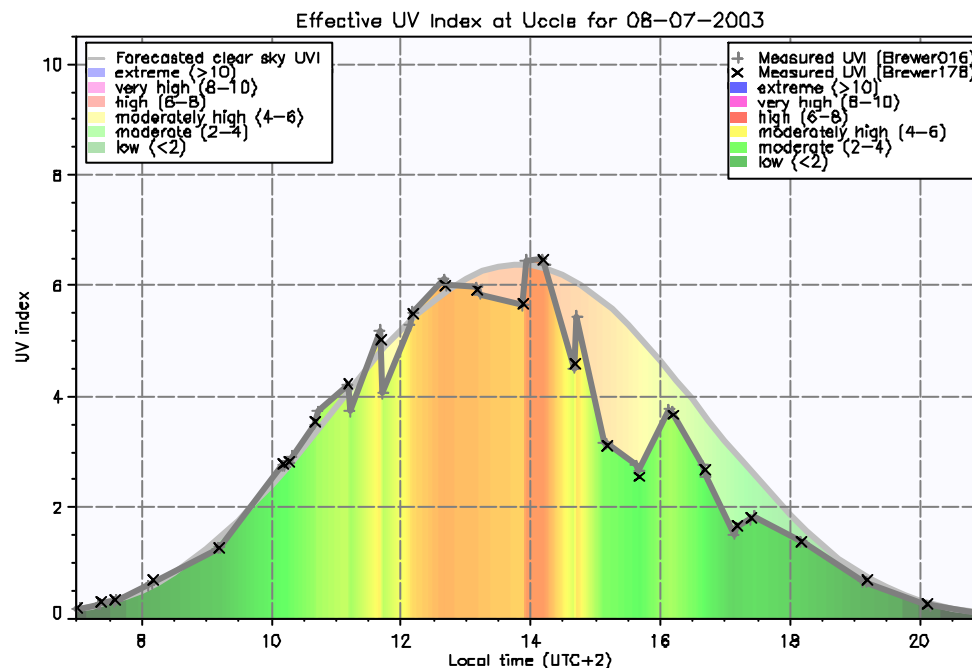
- for near real time applications:
 - daily maximum measured and forecasted UVI to FMI data base
 - daily total ozone to WOUDC for ozone maps
 - ozone soundings to NADIR, for match-like campaigns and transfer to ECMWF
- for long term data series:
 - Dobson, Brewer and ozone sondes in WOUDC, NDSC data-bases (data until end 2002 available)

Valorisation (cont'd)

Contributions to
 scientific symposia & publications
 MIRA reports (VMM by order of the Flemish government)

dissemination of UV forecasts

Website <http://ozone.meteo.be> contains also UVI forecast and measurements



In progress ...

More features of secondary maxima in ozone profiles

Rework ozone data of Brewers #016 and #178 with new calibration data, including re-submission to data-bases, new comparisons with Dobson #40.

Interpretation of UV data with meteorological (cloud), ozone and aerosol data