



QUALITY ASSURANCE OF A SOLAR UV NETWORK IN THE ANTARCTIC

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MAR-Project (Measurement of Antarctic Radiance for monitoring the ozone layer)

General goals:

- Promote observations and research of stratospheric ozone, UV radiation and related physical parameters in the Antarctic region.
- Determine the variations in ozone concentration, spectral UV radiation and photosynthetic active radiation.
- Improve the knowledge of the meteorological and chemical mechanisms that determine the Antarctic atmosphere throughout the winter and its features in summer.

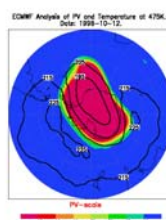
Cooperation between:

- INM** Instituto Nacional de Meteorología (Spain) Quality control of the network. Official data delivery to the international scientific community.
- FMI** Finnish Meteorological Institute Quality assurance of the network.
- CADIC** Centro Austral de Investigaciones Científicas (Argentina) Operation of the instruments and data transfer.
- DNA-IAA** Dirección Nacional del Antártico-Instituto Antártico Argentino Operation of the instruments and data transfer.

Stations

- Belgrano II:** 77°52'S 34°37'W
- Marambio:** 64°14'S 56°37'W
- Ushuaia:** 54°48'S 68°19'W

Possibility to study the impact of the daily changes of the polar vortex on ozone and UV radiation reaching the ground.



References

Dahlback A., B. Johnsen, B.A.K. Hoiskar, K. Lakkala and U. Wester, 2002: Intercomparison of 5 multi-channel filter radiometers. Measurements of UV-doses, total ozone abundances and cloud effects. *Manuscript to be included in the final report of the NOGIC2000 -intercomparison held in Tylösand, Sweden.*

Ylianttila, L., U. Wester, L.E. Paulsson and H. Slaper, 2002: UV dose rates measured with broadband, multichannel and spectral instruments. *Manuscript to be included in the final report of the NOGIC2000 -intercomparison held in Tylösand, Sweden.*

Acknowledgments

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INSTRUMENTS

NILU-UV multichannel radiometer

- 5 channels measuring UV radiation
- center wavelengths at around: 302 nm, 312 nm, 320 nm, 340 nm, 380 nm
- bandwidths around 10 nm at FWHM
- 1 channel for photosynthetic active radiation (PAR): 400–700 nm



Quality control of the NILU-UV of Marambio and Ushuaia

- Stability:** Lamp measurements every second week
- Correction of observed drift ⇒ See poster of Torres et al. in ST010.

Quality assurance of the network

- Traveling reference NILU-UV:** Transfer of the irradiance absolute scale from the reference spectroradiometer.
- Solar comparisons**

Stability of the reference NILU-UV

- Lamp tests:** Before and after each solar comparison
- Drift observed in channel n.5

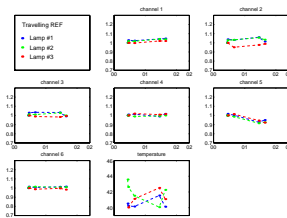
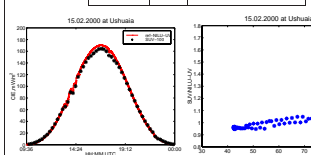


Figure 2. Traveling reference lamp tests.

Absolute irradiance scale

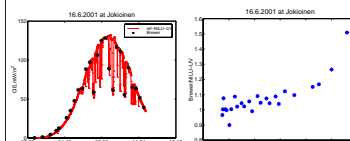
- Bentham double monochromator calibration,** Izaña August 1999.
- Nordic Ozone and UV group **intercomparison** campaign (NOGIC) in 2000, Tylösand Sweden. Ylianttila et al. 2002 ⇒ (REF_{Nog}/NILU-UV=1.02) Dahlback et al. 2002 ⇒ diff. from ref. Bentham (-0.5±3.1%)
- Solar comparisons with SUV-100 spectroradiometer** in Ushuaia.

Date	SZA	SUV/NILU-UV
1.12.99	34.4	0.89
15.2.00	43.3	0.96
6.5.00	74.8	1.05
27.10.00	43.0	0.94
9.2.01	51.9	0.98
18.5.01	74.9	1.05
17.10.01	45.7	0.98



Solar comparisons with Brewer spectrophotometers of FMI.

Date	SZA	REF/NILU-UV
22.10.99	78.9	1.03
10.6.00	34.3	0.98
10.6.00	37.9	0.99
16.6.01	37.7	1.00
15.8.01	53.4	1.05



Solar comparisons in Marambio and Ushuaia

- Reference NILU-UV stable within ±5%
- Calibration factors for Marambio and Ushuaia

$$CF_{i,t} = \frac{(U_{ref,t} - U_{i,t-1})}{(U_{i,t} - U_{i,t-1})} \quad (1)$$

where $U_{ref,t}$ is the CIE-weighted dose rate of the reference NILU-UV and $U_{i,t}$ is the corresponding UV dose rate of the site i NILU-UV.

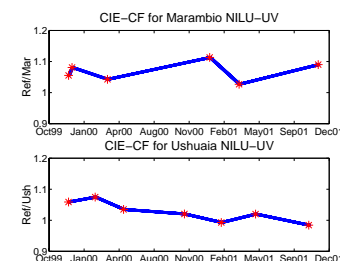


Figure 5. Calibration factors at each solar comparison and linear interpolation between them.

- Corrected CIE UV dose rates

UV-index time series in Marambio and Ushuaia 2000-2001

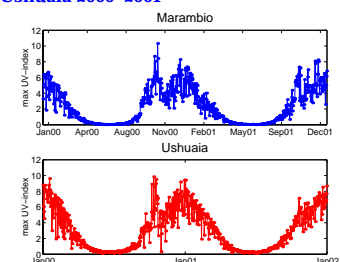


Figure 6. Daily maximum of half hour average UV index in Marambio and Ushuaia.

