

File Revision Date:

October 16, 2024

Data Set Description:

PI: Dr. Rolf Rüfenacht
Instrument: Dobson (Brewer)
Site(s): Arosa LichtsKlimatologie Observatorium, LKO (until: 18.02.2021)
Physikalische Meteorologische Observatorium Davos, PMOD / WRC (since:
23.02.2021)
Measurement Quantities: Total column ozone

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DOI:

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Reference Articles on Dobson total ozone:

WMO/GAW: Reports on WMO International Comparisons of Dobson Spectrophotometers, WMO Report Series No. 138 and No. 108

Stubi, R., H.Schill, J. Staehelin. Instruments stability: experiences from Arosa Observatory. The sixth biennial WMO Consultation on Brewer Ozone and UV Spectrophotometer Operation, Calibration and Reporting, Tokyo, Japan, July 2000. WMO/GAW (to be published)

Weiss, A. K.: Anthropogenic and Dynamic Contributions to Ozone Trends of the Swiss Total Ozone, Umkehr and Balloon Sounding Series, Dissertation ETH No. 13635, GCA-Verlag Herdecke, 2000.

René Stübi, Herbert Schill, Jörg Klausen, Laurent Vuilleumier, Julian Gröbner, Luca Egli, Dominique Ruffieux, On the compatibility of Brewer total column ozone measurements in two adjacent valleys (Arosa and Davos) in the Swiss Alps Atmos. Meas. Tech., 10, 4479–4490, 2017, <https://doi.org/10.5194/amt-10-4479-2017>

Johannes Staehelin, Pierre Viatte, Rene Stübi, Fiona Tummon, and Thomas Peter, Stratospheric ozone measurements at Arosa (Switzerland): history and scientific relevance, Atmos. Chem. Phys., 18, 6567–6584, 2018, <https://doi.org/10.5194/acp-18-6567-2018>

Instrument Description:

Dobson spectrophotometer instrument No. D062 was in use for ozone column measurements at Arosa until February 17 2021. It has been relocated and is measuring at Davos since February 24 2021. Dobson spectrophotometer instrument No. D101 now is the main instrument in use for ozone column. D051 for Umkehr and sporadically ozone column measurements at Davos.

Algorithm Description:

Uses algorithm set out in "Operations handbook - ozone observations with a Dobson spectrophotometer", W.D. Komhyr, Global Ozone Research and Monitoring Project. Report 6, World Meteorological Organisation, Geneva, 1980.

Uses Bass/Paur (1992) ozone absorption coefficients.

Expected Precision/Accuracy of Instrument:

"Review of the Dobson spectrophotometer and its accuracy", Reid E. Basher, Global Ozone Research and Monitoring Project. Report 13, World Meteorological Organisation, Geneva, 1982.

Instrument History:

- July 1999: Participation to the Arosa (Switzerland) Dobson Intercomparison (reference instrument: D065)
- July 1995: Participation to the Arosa (Switzerland) Dobson Intercomparison (reference instrument: D065)
- July 1999: Participation to the Arosa (Switzerland) Dobson Intercomparison (reference instrument: D065)
- July 2003: Participation to the Arosa (Switzerland) Dobson Intercomparison (reference instrument: D064)
- July 2006: Participation to the Arosa (Switzerland) Dobson Intercomparison (reference instrument: D064)
- July 2010: Participation to the Arosa (Switzerland) Dobson Intercomparison (reference instrument: D074)
- July 2012: Participation to the Arosa (Switzerland) Dobson Intercomparison (reference instrument: D074)
- 2012: Dobson D051 and D062 have been automated and compared to D101 manually operated
- 2014: Dobson D101 has been automated
- July 2017: Participation to the Arosa (Switzerland) Dobson Intercomparison (reference instrument: D074). Very limited data set due to adverse weather.
- July 2018: Participation to the Arosa (Switzerland) Dobson Intercomparison (reference instrument: D064)
- August 2024: Participation to the Davos (Switzerland) coincident Dobson and Brewer Intercomparison (reference instrument D064)

MeteoSwiss has moved the six Arosa instruments (Dobson D051, D062, D101 and Brewer B040, B072, B156) to Davos station. These sites are separated horizontally by 11 km and have an altitude difference of 260 m, Davos being lower. Parallel measurements between the two sites have been conducted over

more than 5 years with Brewer and Dobson spectrophotometers. No significant break is expected to have been introduced in the Arosa series with this site change.

The recent analysis of the changes are found in the following papers:

Stübi et al., Quality assessment of Dobson spectrophotometers for ozone column measurements before and after automation at Arosa and Davos, *Atmos. Meas. Tech.*, 14, 4203–4217, 2021, <https://doi.org/10.5194/amt-14-4203-2021>

Stübi et al., A fully automated Dobson sun spectrophotometer for total column ozone and Umkehr measurements, *Atmos. Meas. Tech.*, 14, 1–13, 2021, <https://doi.org/10.5194/amt-14-1-2021>

Groebner et al., Consistency of total column ozone measurements between the Brewer and Dobson spectroradiometers of the LKO Arosa and PMOD/WRC Davos, *Atmos. Meas. Tech.*, 14, 3319–3331, 2021 <https://doi.org/10.5194/amt-14-3319-2021>