South American Dobson Intercomparison Campaign for RA-III

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1999 › 2003 › 2006 › 2010 › 2019 › 2025

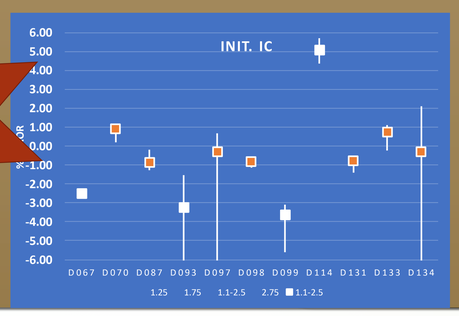
The WMO Scientific Advisory Group on Ozone recommends that Dobson Spectrophotometers should be calibrated every six years.

Introduction

The WMO/GAW GAW Regional Dobson Calibration Centers (RDCC) RAIII international comparison of Dobson spectrophotometers was held 4 March to 22 March 2019 at Buenos Aires, Argentina. This activity is performed as a QC requisite condition for monitoring atmospheric total ozone. The individual participants performed the calibration procedure under the supervision of scientific staff. The event also provided instructions on standard operating procedures for making observations with a Dobson spectrophotometer, conducting routine maintenance checks, and data management.

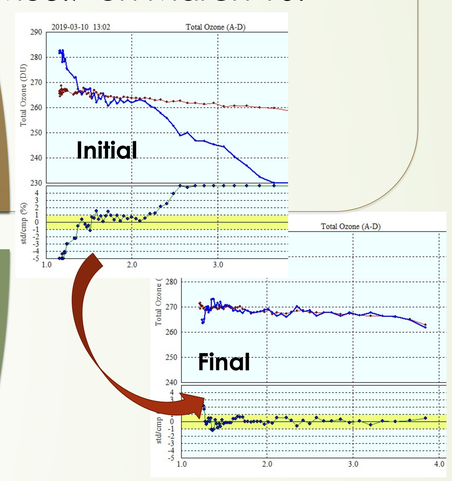
Dobson spectrophotometers operated in the Latin America network are regularly calibrated at international comparisons performed under the GAW program of the WMO.

Initial IC



A continuous intercomparison requires a half a day.

Initial comparison was performed from NOON to Mu3.7 on March 10.

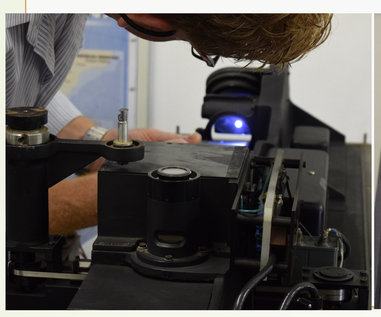


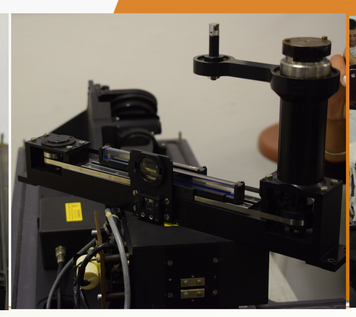
When an initial comparison to a standard instrument exceeds 1% error, maintenance and lamp tests are performed followed by a another intercomparison. Data between the previous and present calibrations should be re-calculated.

Maint

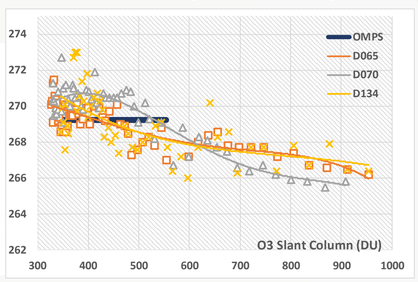
Optical adjustments were made based on results of the initial intercomparison, routine Mercury Lamp, Standard Lamp, and a Symmetry tests.

- Several instruments required optical wedge calibrations by the two lamp method, or replacement of optical mirrors.
- Electronic parts and components were also replaced as needed.





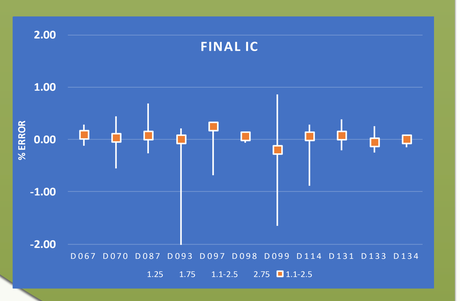
This decides the extra-terrestrial constant (ETC) coefficient (N-tables).



A final comparison was performed after instrument maintenance, and new RN tables for each instrument were created based on the results. New standard lamp reference values were also determined

Final IC

The final comparison after instrument maintenance shows decreased Mu dependence.



Analysis

The final intercomparison showed a maximum difference of 0.2% in total ozone values from the standard for ADDSGQP observations in mu range 1.5 to 2.5.

Acknowledgements.
The authors wish to thank G. Carbajal Benítez and R. Sánchez of Atmospheric Watch & Geophysics SMN, and also like to thank All the participants. This work was supported by the WMO/GAW, for the Vienna Convention Trust Fund.

- All the participants in this campaign

Umkehr Intercomparison

March 21 AM, 2019

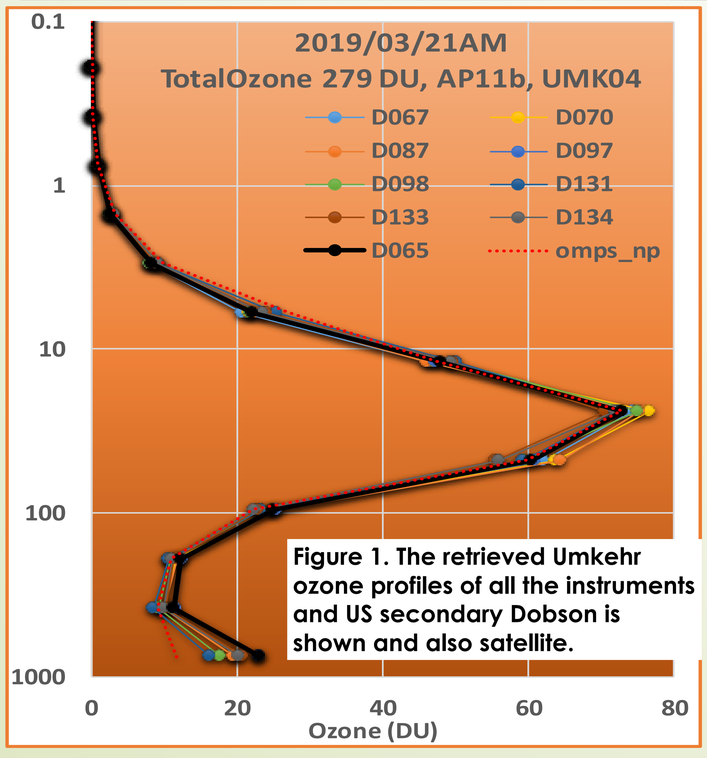


Figure 1. The retrieved Umkehr ozone profiles of all the instruments and US secondary Dobson is shown and also satellite.

Table and Map 1.
Participating countries and Dobson instruments

Dobson #	Station / Organization	Country	WOUDC ID / Others
065	NOAA	USA	**World Secondary**
067	La Habana / Instituto de Meteorología de Cuba	CUBA	311
070	Buenos Aires / Servicio Meteorológico Nacional	Argentina	091/**RA III Std.**
087	Marcapomacocha / Servicio Nacional de Meteorológico e Hidrografía de Perú – SENHAMI	PERÚ	429
093	Sao Paulo / Instituto Nacional de Investigaciones Espaciales (INPE)	BRASIL	200
097	La Quiaca / Servicio Meteorológico Nacional	Argentina	513
098	Cd. De México / Instituto de Geofísica, UNAM	MÉXICO	192
099	Estación Antártica Marambio / Servicio Meteorológico Nacional	Argentina	233
114	Natal / Instituto Nacional de Investigaciones Espaciales (INPE)	BRASIL	219
131	Ushuaia / GAW Station, Provincia de Tierra del Fuego, Antártida e Islas del Atlántico Sur. Servicio Meteorológico Nacional	Argentina	339
133	Comodoro Rivadavia / Servicio Meteorológico Nacional	Argentina	342
134	El Salto / Instituto Uruguayo de Meteorología	URUGUAY	343