Statement of SAG-Ozone

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SAG-Ozone, GAW/WMO

SAG-Ozone: Members

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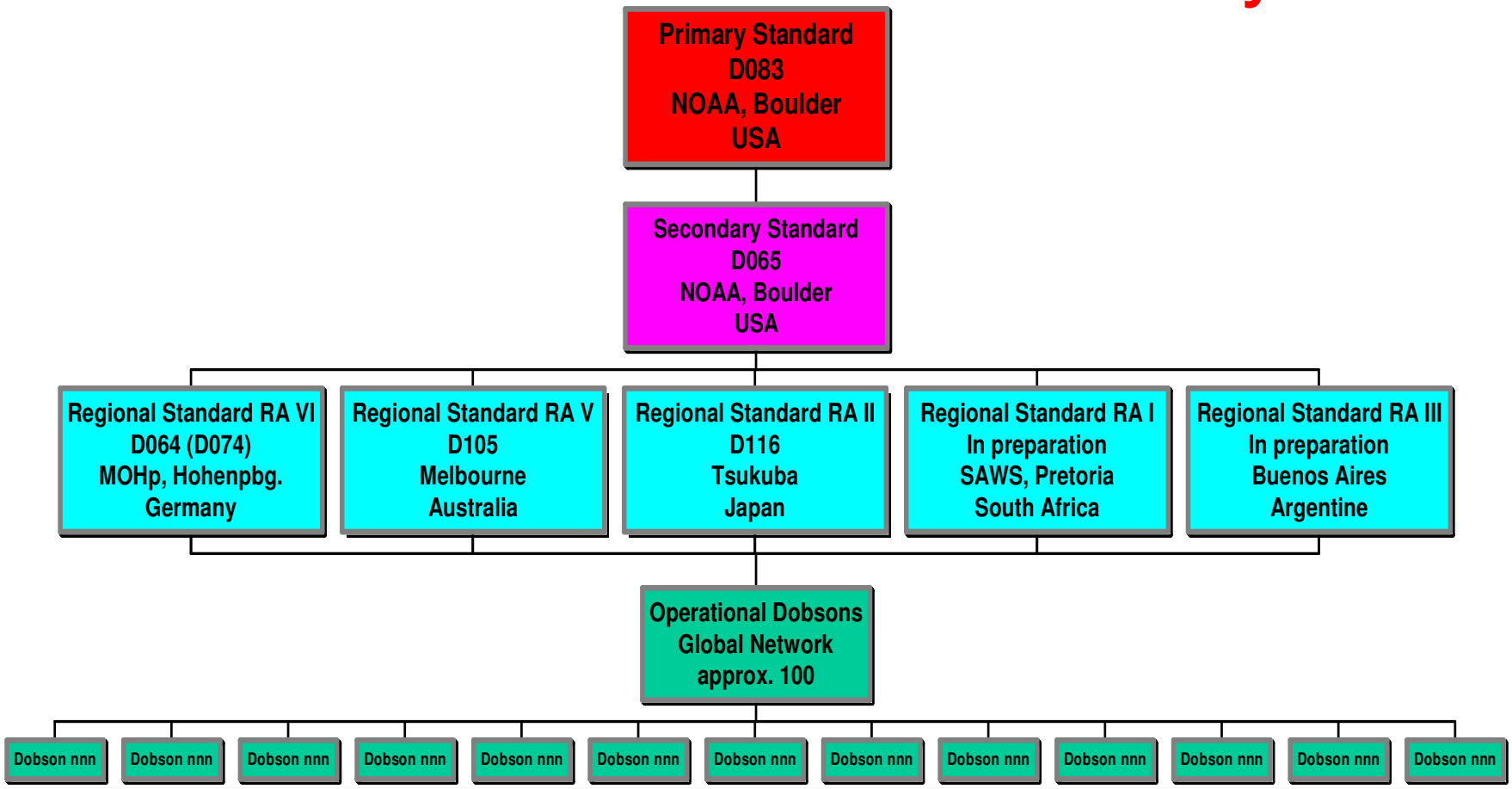
Task of SAG-Ozone: Data Quality for ground-based total ozone measurements (Dobson and Brewer). **Ground based measurements important for satellite validation**

Global Dobson Calibration System



Calibration of Brewer spectrophotometers

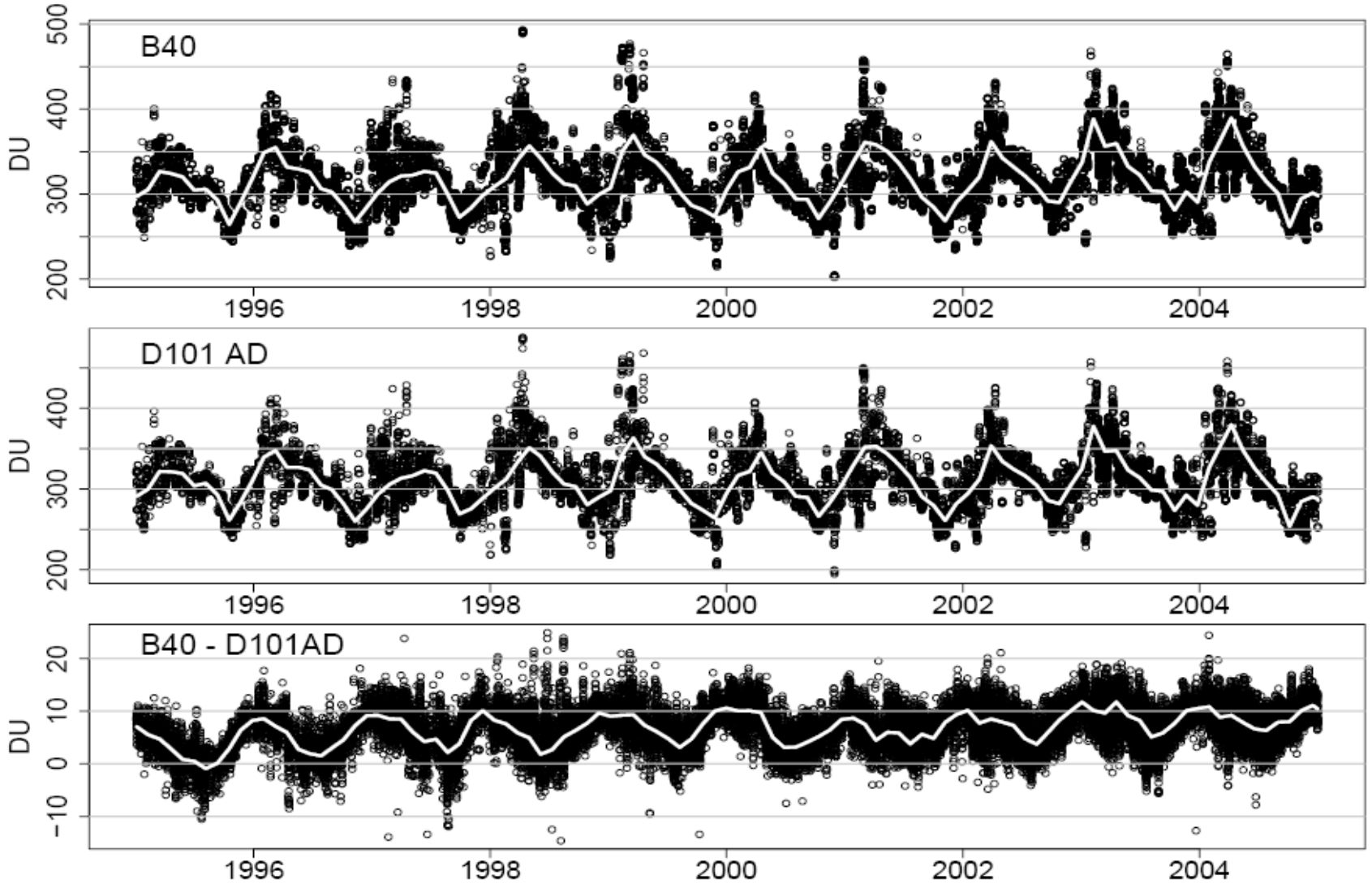
- Triad operated at Toronto (Canada), one of instruments regularly absolutely calibrated by Langley plot method in Mauna Loa Observatory (Hawaii)
- Triad operated at Izana (Tenerife, Spain), Langley plot calibrations in Tenerife)
- Calibration of station instruments: Mostly private companies

Ozone cross sections used for sun photometers

- Ny and Choong, 1932
- Geophys. Year (July, 1957): Vigroux (1953)
- WMO, 1968: Modified values redetermined by (Vigroux, 1967) recommended by IAMAS
- WMO, 1991: Bass and Paur (1985)

  (explanation of problems known for D wavelength pair in Dobson instruments unknown)
- ???

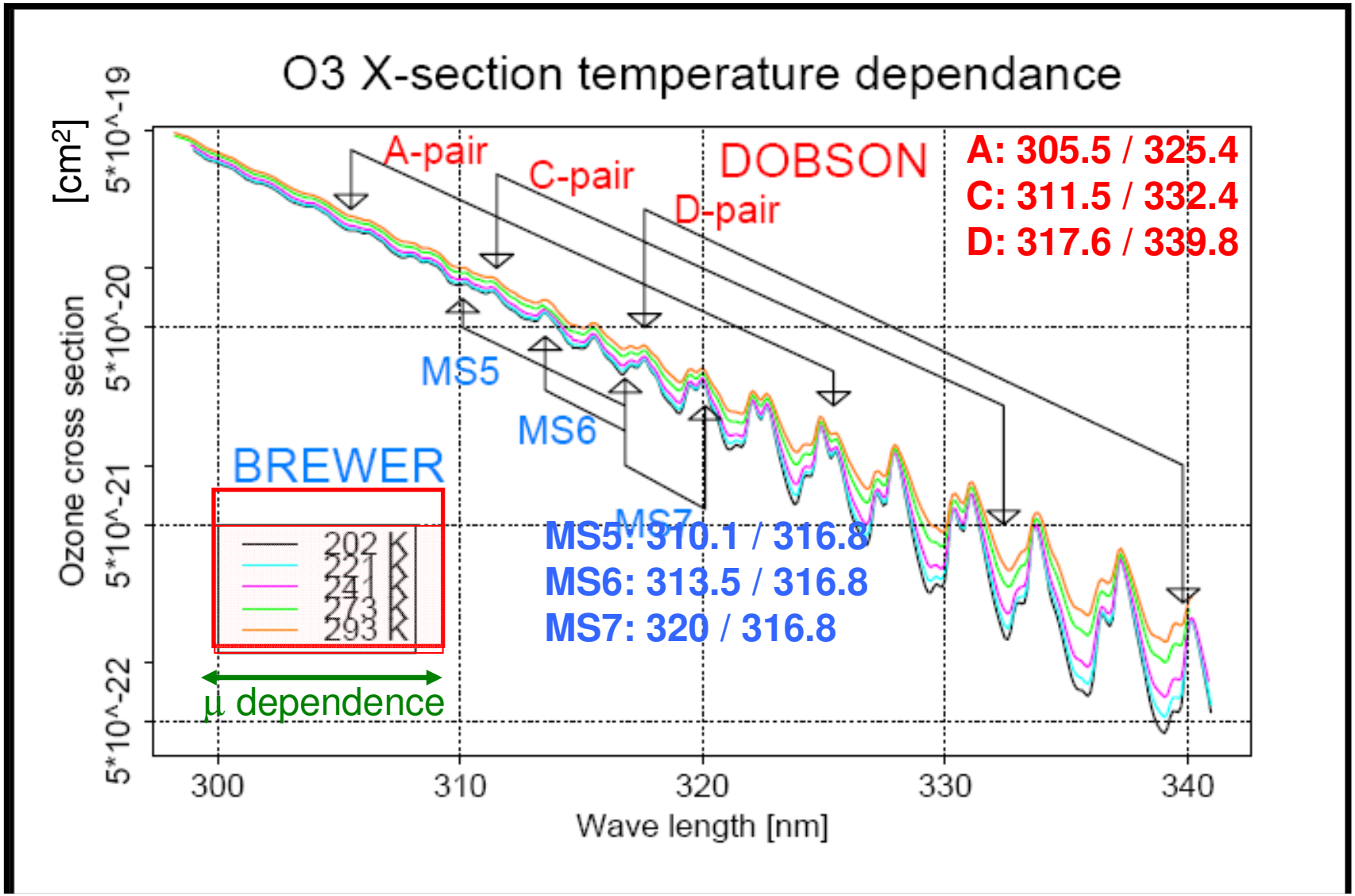
Presently used retrieval algorithm of Dobson and Brewer instruments ignore temperature dependence; Barbara Scarnato



Seasonal variation

Retrieval algorithms of both instruments ignore temperature dependence of O_3 cross sections (Dobson: -46°C; Brewer: -44°C)

One reason for difference in seasonal variation: Kerr et al., 1988



IO_3C/WMO-GAW Expert Team on Absorption Cross Sections of Ozone (ACSO)

Orphal Johannes chair
Bhartia PK ex officio
Braathen Geir ex officio
Zerefos Christos ex officio
Tamminen Johanna ex officio
Staehelin Johannes ex officio
Zehner Claus ex officio
Evans Robert, Dobson
McElroy, Thomas Brewer
Godin-Beekmann Sophie, Lidar
Bais Alkiviadis
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Pitts Michael, sat. exp., Chappuis band
McPeters Richard, sat. expert
Flittner David, sat. expert
Chance Kelly, sat. expert GOME
Balis Dimitris, satellite valid
Liu Xiong, GOME
Hare Ed data, archive (WOUDC)

Key questions of ACSO (and community)

Laboratory measurements: review of ozone absorption cross sections in Huggins band incl. temperature dependence;

- Need for new laboratory measurements (resolution, wavelengths, temperatures) ?
- If yes: feasibility and time demand of new laboratory measurements ?

Other information of ozone cross section in Huggins band (ground based spectral measurements) ?

Impact of changing cross sections in ozone measurements

- validation/comparison (sensitivity studies)
- uncertainty related to ozone measurements due to uncertainty in cross sections

Key questions, Outcome of meeting

Practical implications if we decide to change:

- new algorithms for ground based (temp dependence)
- logistics
- old data, data archives, reprocessing, long time series

....??

Action plan of work of expert team, including time planning

Next steps, dead lines, further meetings (possibly in groups)

Product of work: Report (as much as possible based on published papers), dead line: 2 years

Suggestions Pawan K. Bhartia

1. Compare the wavelength dependence of the temperature coefficients of ozone absorption cross-sections measured in the laboratory by different groups. Evaluate using molecular theory and field measurements, such as Jim Kerr's Mauna Loa study, and analysis of spectral fitting residuals of satellite data. Provide a consensus estimate of these coefficients, particularly the slope of the cross-sections with temperature around -45C.

Suggestions Pawan K. Bhartia

2. Compare ozone absorption cross-sections at -45C measured in the laboratory by different groups, focusing on the 310-350 nm wavelength region where high accuracy is critical for the study of tropospheric ozone and other trace gases for which ozone is an interference. Evaluate using residuals from the spectral fitting of the radiance and irradiance data collected from ground-based and satellite instruments. Provide a consensus estimate.