

# Report of the 2<sup>nd</sup> Meeting of the WMO Brewer Sub-Committee Toronto, Canada, September 17, 2002

**Chairman: J. B. Kerr**  
**Rapporteur: E. W. Hare**

<b>In Attendance</b>	<b>Affiliation</b>
H. De Backer	Royal Meteorological Institute of Belgium
B. Dieterink	Kipp & Zonen
V. Fioletov	Meteorological Service of Canada
T. Grajnar	Meteorological Service of Canada
E. Hare	Meteorological Service of Canada
J. Kerr	Meteorological Service of Canada
Ken Lamb	International Ozone Services Inc
A. Maione (Guest)	Kipp & Zonen
T. McElroy	Meteorological Service of Canada
M. Proffitt	World Meteorological Organization
K. Vanicek	Czech Hydro-Meteorological Institute

## **Absent**

A. Bais	Aristotle University of Thessaloniki
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## **Agenda and Current Major Issues**

- 1. Introduction – J. Kerr**
- 2. Reading of SAG Ozone Recommendations – M. Proffitt and K. Vanicek**
- 3. Discussion of Major issues (as outlined) - All**
  - Major Issue Topics**
    - Calibration**
      - Submission Of Calibration Records To WOUDC
      - Secondary Calibration Standard
    - Standard Operating Procedures**
      - Observing Schedules
      - Maintenance Schedules
    - Data Submission**
      - Encouraging Raw Data And Calibration Records
      - Higher Percentage Of Brewer Stations Submitting
    - Umkehr**
      - Measurements Records Should Continue
      - Encourage Analysis Of Records
      - Development Of Algorithm
    - Hardware Issues**
      - Manufacture Of Instrument
      - Availability Of Parts (Especially The Electronics)
- 4. Closing of meeting – J. Kerr**

# Meeting Summary

## **1. Introduction**

J. Kerr opened the meeting and welcomed all members. The meeting began with a review of the Scientific Advisory Group for Ozone (SAG\_O3) recommendations that were drafted at the September 9-10, 2002 meeting in Toronto. Refer to Annex A for these recommendations. J. Kerr provided a list of “major issues” confronting the Brewer community for the group to discuss.

## **2. Discussion of Major Issues**

### **Calibrations**

A key issue with respect to calibrations is the submission of these data to the Brewer Data Management System (BDMS) component of the WOUDC. K. Vanicek suggested that a method of dealing with calibrations and information for Brewers be similar to those practises used by the Dobson community. He also mentioned that this issue was discussed at the WMO Regional GAW meeting held in Riga, Latvia. E. Hare added that presently, there are no “formal” calibration histories archived at the WOUDC/BDMS.

M. Proffitt mentioned that there are GAW reports involving Dobson inter-comparisons. Annex B lists the reports.

K. Lamb commented that the content of Brewer constants files and reports have not been detailed in the past and within the last several years he has attempted to secure such information. A. Maione noted that it should be the individual operator’s responsibility to report such information because reports are left in their charge. He also mentioned that the calibration information should be viewed as being a sub-set of a larger, more detailed document. Such a document maybe similar to the “data passport” approach adopted within the UV community.

T. McElroy mentioned that perhaps data should not be included within the WOUDC or BDMS without such supporting information. Perhaps the committee for the SAG Ozone and UV could broadcast a “call” for such data to be submitted to the WOUDC/BDMS archives.

Both M. Proffitt and J. Kerr suggested that the first step is to get the calibration dates in order. K. Vanicek noted that within the Dobson community information about the Dobson network is housed at NOAA in Boulder, with Bob Evans. He suggested that the Brewer community consider a similar approach for Brewer calibration records at the MSC-BDMS.

E Hare suggested that the general community (at the plenary session) be consulted on what the sub-committee should be doing to obtain such information.

V. Fioletov mentioned that a good start would be to examine the B-Files from the travelling standard (BR#017) used by International Ozone Services Incorporated. This may lead to dates and locations.

M. Proffitt supports the idea of contacting each responsible agency suggesting that they provide the necessary information, most importantly and urgently, the list of calibration dates. K. Vanicek also supported this idea and suggested a broadcast email. T. McElroy suggested that such a communiqué should be a joint WMO/MSC-WOUDC request.

***Action Item: the MSC will undertake the writing of the call letter for enhanced information on calibrations and pass it by the committee.***

M. Proffitt suggested that the committee move slowly by first adopting the suggestion of examining the BR#017 data to get a “sense of things”. T. McElroy added further that “maybe we should express our desirability to get access to the data with the satellite community now involved”. It was also noted that this approach can possibly be used as the rationale.

K. Vanicek further added that those individuals responsible for calibrations still need to be involved with the process.

Discussions shifted to another related topic, the Regional Calibration Centre being established at the Izaña station, Tenerife, Spain. K. Vanicek agreed to send the proposal for this Centre to each of the Brewer Sub-committee members. T. McElroy suggested that the WMO be involved. Vanicek replied that this proposal was discussed at the WMO meeting in Riga, Latvia and an official proposal was presented. It was also presented at the SAG Ozone meeting of September 9-10, 2002. J. Kerr acknowledged that the meeting recognises the proposal and encourages further endorsement of this proposal. Vanicek also mentioned that the European plan or “model” requires a certain level of voluntary participation in such ventures which in turn benefits from a central location (for Europe) in order to reduce costs especially for travel.

B. Dieterink also mentioned that there are two commercial representatives that have invested interest in the training of people for such activities. He also noted that before any calibrations begin, one needs to service the instrument which requires a high level of expertise and can be quite costly. He added that Kipp and Zonen maintains a travelling standard at its own expense. The group agreed that there is an understanding that “industry” would be contacted. The point was made that the Kipp and Zonen travelling standard is at the MSC in Toronto as is the IOS travelling standard, Brewer #017.

J. Kerr suggested that the European operators should be contacted and be asked to respond to this proposal, which may involve the Kipp and Zonen participation. V. Fioletov reminded the group that from the satellite community perspective it is better to have three well calibrated Brewer instruments in the tropics than twenty in Europe. K. Vanicek replied that there is no mechanism, to do calibrations outside of Canada.

In conclusion, K. Vanicek agreed to encourage this activity and the committee will endorse making this presentation to the WMO.

### **3. Training of Operators and Capacity Building**

J. Kerr expressed some concern regarding the Standard Operating Procedures (SOPs) and said that variations of these SOPs have been suggested by K. Vanicek, T. Grajnar and NASA, but he was unsure as to what are the actual SOPs? He noted that the SOPs appear to be somewhat independent. K. Vanicek recommended that if the MSC has some SOPs then he suggests that these be published by the

WMO/GAW. Kerr agreed that the Canadian Brewer network would be a good starting point for a SOP document. He also noted that the Brewers are more complicated which will make this document creation a daunting task.

M. Proffitt mentioned that the purpose of capacity building was to allow operators to “get their hands on” the instrument and that the use of SOPs are an important part of this concept. T. McElroy added that there are two distinct issues. One, what do we want to do with the instrument? He suggested posting the Brewer schedules on the web, starting with the DS schedule as a starting point. And second, he hopes that the community of Brewer users’ learning curve increases better than the instrument degradation so that not to affect the quality of data.

The discussion closed with some recommendations.

1. That there needs to be a connection between the operational procedures to the scientific requirements.
2. That a sample SOP be distributed.

***Action Item:*** T. Grajnar will email a sample of the MSC Brewer SOPs to the community.

#### **4. Data Submission**

E. Hare and V. Fioletov updated the group on the data within the WOUDC and BDMS archives, which was more in volume than the study provided by K. Vanicek.

T. McElroy suggested that the WMO has encouraged competing databases, that there are some historical reasons, but the examples of NILU and NDSC suggests that the WMO wants to recognise these centres and yet get their data archived at the same time in the WOUDC. M. Proffitt replied that the WMO has sought after the submission of data to the WOUDC. Given that the NDSC 2002 meeting had just concluded one week prior, McElroy suggested that the NDSC now understands the problems of multiple data centres. J. Kerr mentioned that from a data originator perspective, there are too many data centres and he sees this as a problem for data submission.

#### **5. Umkehr Data Analysis**

The most recent version of the McElroy Umkehr program is about 3 years old. T. McElroy will work to get an updated version completed. He mentioned that EC was to send a recent graduate from Greece to work on the integration of the Brewer and the Dobson data. However, the student ended choosing Boulder for his post-doctoral work.

***Action item:*** E. Hare will provide a current Umkehr station table to the committee.

The meeting was adjourned by Chairman, J. Kerr.

## **Annex A**

### **Recommendations** **of the** **Scientific Advisory Group for Ozone of WMO-GAW**

**(Prepared at the SAG-O3 meeting in Toronto, September 09-10, 2002)**

1. WMO GAW should seek support for Dobson calibrations in developing countries. Otherwise calibrations in developing countries will fall behind schedule.
2. A plan must be made to augment and extend the existing system of calibration and maintenance of Brewer instruments, which is presently being performed by private companies. An evaluation of the history and efficiency of the existing Dobson calibration system, which is operated through cooperation between the individual users and WMO-GAW oversight, would be useful in forming this plan.
3. Calibration histories of the Dobson, Brewer and FSU filter instruments should be incorporated in to the WOUDC as assistance to the data users.
4. Creation of a regional Brewer calibration system in the RA-VI Region operated under the GAW Programme is recommended for long-term maintenance of the Brewer network and for continuity of high accuracy of total ozone observations in the region.
5. Stations with long time records of Dobson data that are considering changing to Brewer instruments should continue to report the Dobson data. If the reporting instrument is to be hanged, the changeover process must be consistent with the recommendations in "Comparison of total ozone measurements of Dobson and Brewer Spectrophotometers and recommended transfer functions" (Staehelin, et al) to avoid discontinuities in the data record.
6. The SAGO3 chairman is directed to contact the manager of the Regional calibration centre for filter instruments at MGO in St. Petersburg to investigate the current status of the network.
7. Standard operating procedures for the preparation of ECC ozonesondes must be finalized as soon as possible after the comprehensive inter-comparison of ozonesondes flown on a single balloon planed for 2003. Additional investigations should be performed to define standard operating procedures for the processing of the data.
8. To guarantee long-term stability of the ozone time series QA of the manufacturing of ozonesondes should be performed on a regular basis by the WCCOS.
9. Continuing Umkehr measurements presently made and expansion to new stations by both Dobson and Brewer instruments should be encouraged.
10. The evaluation of the 1999 algorithm should be completed and a decision made as to whether or not to replace the 1992 algorithm now in use in the WOUDC. Evaluation of the three-wavelength Umkehr measurements made at many stations should be done to identify any possible additional information
11. Measurements of ozone currently being made using LIDAR and Microwave techniques should continue without interruption, and new measurement programmes should be established where local infrastructure and support are sufficient for long term observation series

12. Instruments from South America should be calibrated at the newly established GAW Regional Calibration Centre for surface ozone and data routinely reported to WDCGG at JMA.
13. The WMO should work in collaboration with the International Global Atmospheric Chemistry Project of the Global Troposphere Ozone Project by providing the necessary infrastructure to enhance ozonesonde measurement capabilities.
14. The WMO should embrace programs that educate the public about the importance of ozone as an environmental issue. Specifically, the Global Learning through Observations to Better the Environment (GLOBE) project should continue to be supported.
15. The WMO should continue to encourage the submission of data to the WOUDC in timely manner including more Level 0, data from both Dobson and Brewer networks, especially more processed Brewer Umkehr data. Along with the traditional data files, related metadata and calibration data ( inter-comparison records, calibration histories, logbook notes and scientific sponsorship statement) should be submitted, and also be available from the WOUDC web and ftp sites. In this regard, the WMO-GAW through the WOUDC should continue to build relationships with data originators. Data submissions should be sent directly to the WOUDC by the data originator. If this is not possible, then third party data submission should always link back to the actual data originator.
16. WOUDC should continue improving the data center to meet the growing needs of the ozone community. For this, new web search and visualization tools and ExtCSV format for data submission implemented by WOUDC will be used. The use of other organizations formats will be coordinated by the WOUDC.
17. GAW should emphasize the importance of the long-term ground-based system in maintaining the calibration of the present and future satellite systems. It should specifically seek support for the inter-calibration of network of instruments from the satellite validation programs.
18. It is recommended that GAW begins to take steps to incorporate satellite data at station locations into the WOUDC data base
19. New ozonesonde stations are needed in the northern tropics and subtropics (West Africa, continental Asia, the Middle East, Central America, and the Pacific) to explain discrepancies among global tropospheric chemistry models and the satellite derived data.
20. Contribution of measurements from the ozonesonde stations in the SHADOZ network to the GAW Programme should continue, with expansion desirable.
21. The twinning cooperation and training support for GAW ozone stations in developing countries should be continued and expanded as the situations warrants. The past experiences with these activities have shown valuable results

## **Annex B**

### **A List WMO-GAW Reports** **Related to Dobson Operation, Inter-comparisons and Calibrations**

#### ***From the WMO Global Ozone Research and Monitoring Project Reports series***

<b>Report No.</b>	<b>Title</b>
No. 13	Review of the Dobson Spectrophotometer and Its Accuracy (by Reid E. Basher)
No. 19	Survey of WMO-Sponsored Dobson Spectrophotometer Inter-comparisons (by Reid E. Basher (TD No. 657)
No. 29	Handbook for Dobson Ozone Data Re-evaluation (TD No. 597)
No. 36	Report of WMO/NOAA Meetings on Ozone Data Re-evaluation and use of Dobson and Brewers in the GO <sub>3</sub> OS (Tenerife, June 1994)

#### ***From the WMO Environmental Pollution Monitoring Reports series***

<b>Report No.</b>	<b>Title</b>
No. 108	Report of the Tenth WMO International Comparison of Dobson Spectrophotometers (Arosa, Switzerland, 24 July – 4 August 1995)
No. 118	Report of the international Workshops on Ozone Observation in Asia and the Pacific Region (WOAP, IWOAP-II), (IWOAP, 27 February – 26 March 1996 and IWOAP-II, 20 August – 18 September 1996) (WMO TD No. 827)
No. 138	Reports on WMO International Comparisons of Dobson Spectrophotometers, Parts I – Arosa, Switzerland, 19-31, July 1999. Part II – Buenos Aires, Argentina (29 Nov. – 12 Dec. 1999) and Part III – Pretoria, South Africa (18 March – 10 April 2000) (WMO TD No. 1016)
No. 145	WMO GAW International Comparisons of Dobson Spectrophotometers at the Meteorological Observatory Hohenpeissenberg, Germany (21 May – 10 June 2000), MOHp2000-1), 23 July – 5 August 2000, MOHp2000-2), 10-23 June 2001, MOHp2001-1) and (8 to 21 July 2001, MOHp2001-2). Prepared by Ulf Köhler (WMO TD No. 1114).