Report of the First Meeting of the WMO Brewer Sub-Committee
Sapporo, Japan – July 6, 2000

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

Committee members in Attendance: C.T. McElroy (MSC) , J.B. Kerr (MSC), E.W. Hare (MSC), T. Grajnar (MSC), V. Fioletov (MSC), K. Vanicek (CHMI), M. Proffitt (WMO), J. Daniels (SCI-TEC)

Not in attendance: A. Bais (AUTH), H. DeBacker (RMIB), IOS representative

Guests: A.M. Siani, G. Casale, U. Köhler, J. Gröbner, W.M. Sharobeim, M. Bonitatibus, J. Sabburg, R. Evans, A. Los, R. Stubi, T. Colombo

Agenda and Discussion Items

1. **Introduction – J. Kerr**
2. **SAG_O3 – J. Kerr, M. Proffitt and E. Hare**
3. **Recommendations from the 5th Brewer Meeting, Halkidiki, Greece, 1998 – T. McElroy and E. Hare**
4. **Brewer/Dobson Inter-relationships – J. Kerr and K. Vanicek**
5. **Review of Instruments and Data Reporting – E. Hare**
6. **New Data Analysis Tools for ozone and UV data – K. Vanicek and V. Fioletov**
7. **Ozone Maps – V. Fioletov**
8. **Other Topics**

Meeting Summary

Item 1: J. Kerr opened the meeting by presenting the agenda and re-introducing the group of the function of the sub-committee. Kerr mentioned that at the Fifth Brewer Workshop the members in attendance agreed that a sub-committee should be formed to address issues specific to the Brewer Spectrophotometer community such as: the use and operation of the instrument, data analysis tools and data archiving and retrieval. The recommended committee members are:

J.B. Kerr (MSC) Co-Chairman	C.T. McElroy (MSC) Co-Chairman
V. Fioletov (MSC)	T. Grajnar (MSC)
E.W. Hare (MSC)	M. Proffitt (WMO)
A.. Bais (AUTH)	K. Vanicek/M. Stanek (CHMI)
H. DeBacker (RMIB)	
SCI-TEC representative	IOS representative

Item 2: M. Proffitt (WMO) suggested the need for better communication between Dobson/Brewer groups from the SAG_O3 perspective. He briefly summarised the SAG_O3 meeting and recommendations pertinent to the sub-group. He also suggested that many Brewer users have expressed interest in learning more about the instrument and that this issue needs to be addressed. The advantage of the Dobson inter-comparison includes a workshop and a "class like session" where instruction and tutorials are often part of the agenda. Proffitt suggests that this approach should be investigated from a WMO perspective for the Brewer community.

Item 3: Kerr presented the recommendations and a list of the Steering committee members that were recommended from the meeting of the 5th Brewer Workshop – Halkidiki, Greece. The Canadian influence, in terms of the membership, is expected given the instrument was invented in Canada. Kerr briefly reviewed the recommendations from the 5TH Brewer Meeting. These recommendations are included in Annex I.

Item 4. Kerr suggested that there be inter-comparisons between the Dobson/Brewer communities that are correlated such that there is a sharing of ideas and advantages in instrument detail especially in the maintenance procedures. He mentioned that the MSC has had several training sessions for the Brewer in the past focusing on the Brewer fundamentals – this should be open to the Dobson community as well.

Proffitt mentioned that there is no WMO money to assist in these activities and re-iterated that the MSC should not be expected to pay for travel, but the staff time and facilities are offered free. This is all that MSC can commit. He also suggested that a WMO report summarising the various inter-comparisons from both Dobson and Brewer instruments would be a useful document to both instrument communities.

Kerr proposed that Dobson inter-comparisons (at least the ones involving many instruments) include at least one Brewer. Proffitt furthered this proposal by suggesting that the WMO would like to see these inter-comparisons happen every four years

Item 5: E. Hare reviewed the status of the Brewer Data Management System (BDMS) and emphasised the off-site archive service that MSC continues to offer data originators. The primary (Level 0) data will not be released without the expressed approval of each data originator. He mentioned how several data originators have submitted UV data files and that V. Fioletov has been working with these agencies in the analysis of their data and processed data products that are then submitted on each agency's behalf to the WOUDC. There are over 50 International Brewer instruments contributing to the BDMS archive, the largest single agency being the US-EPA with over 20 Brewers contributing data.

Vanicek asked about the "official" release of the new extended Comma Separated Values (extCSV) format. Hare replied that eventually a letter will be sent by the WOUDC to promote the use of the new format simply for the capability of supporting higher spatial and temporal resolution. Vanicek thought it would be best to have the WMO release the letter "officially".

Item 6: Vanicek informed the group of the representatives from Egypt, Brazil and Thailand have had a Brewer training in conjunction with a Dobson training session. He presented an overview of the latest version of the Czech Brewer Analysis package version 1.5 that is intended to assist operators with several levels of analysis options and provide output options for the various data submissions such as the new extCSV format.

Vanicek suggests that the software will eventually be used as shareware – for testing purposes. He also informed the group that Martin Stanek will replace him on the sub-committee. The committee acknowledged and endorsed this change.

Fioletov mentioned the analysis tools he has developed for the Brewer UV data analysis. This software package can handle the full suite of UV data analysis processing, quality assurance and output formats – data originators can view summary files and plots to make decisions about their data products.

The data processing is in two steps: first, the processed data are placed into a secure ftp account, where the data are available to the originator to review. Once the data have been examined and endorsed by the originator then the second step is the submission of the data to the WOUDC as the "official", sanctioned data set.

Item 7: Fioletov reported on the new near-real-time (nrt) total ozone maps that the MSC has been producing using nrt ground-based, satellite and archived total ozone data. These maps are similar to the ones produced by the WMO Northern Hemisphere Ozone Mapping Centre at the Aristotle University of Thessaloniki (AUTH) located in Thessaloniki, Greece. An agreement has been made between the MSC and the AUTH to co-operatively provide map products – the new mapping software examines the data based on the 30 year maps currently on display at the Exp-studies/ WOUDC web sites.

Vanicek suggested that there is a need for the actual data values for people who require nrt total ozone data. These data can be made available through the use of Global Transmission System (GTS) as the nrt data transport mechanism using the WMO supported CREX encoders/decoders. These CREX packages are available for submitting nrt data using the GTS service. Currently the Czech station at Hradec Kralove, the JMA station Tateno and five Canadian stations post data using the GTS. Vanicek also suggested that the WOUDC should use the GTS so that all users will have access to the data.

Vanicek briefly presented the WMO sanctioned CREX format for total ozone and he re-iterated that the encoding/decoding software is freely available. Fioletov mentioned that the WOUDC will accept data in CREX format for the daily ozone maps.

Item 8: Daniels gave the group an update on the Brewer inter-comparison activities using BR#158. UV calibrations are being done on site. He also mentioned that a new, operational software package will be made available soon, perhaps by October 2000. This new software is intended for use with new, faster computers and so the Brewer software can make use of these capabilities. The main advantage is to indicate the "health" of the Brewer instrument and to assist the operators with maintenance issues. Daniels invited the Brewer users to come up with ideas of what they would like to see in the new software, since he is now the new the software manager.

Daniels also mentioned that another change to the Brewer is the electronics. There will be some conversion required from the single board electronics will likely have to be made as the instruments ages. Proffitt asked about the cost. If the retro-fits are expensive than this will likely be a problem. Daniels last comment on the hardware was that new electronics do not do anything too different than the old except for faster communication. There is also a built in humidity sensor.

Proffitt asked that in the next 5-10 years will all of the approximately 150 active Brewer instruments require conversion? Daniels did not seem to think so, but added that in order to make these existing Brewers to continue for as long as possible may require some form of upgrades or retro-fits. Proffitt suggested to the group that the Brewer community needs to think in terms of decades that this is very important. And that cost is a big factor, one that could be viewed as prohibitive in terms of maintaining an active and reliable global network.

J. Kerr closed the meeting.

Annex I – Recommendations form the 5TH Brewer Workshop, Halkidiki, Greece, 1998

The members of the 5th Biennial Brewer Users' Meeting Recommend:

1. The Brewer workshop participants endorse the formation of a Brewer steering committee which will carry out tasks that will facilitate the operation of and improve the performance of the Brewer global ozone network. This committee should be chaired by a person who is appointed by the WMO Scientific Advisory Group for ozone measurement and who reports directly to the WMO SAG for ozone measurement and the WMO SAG for UV measurements. The tasks and responsibilities of the Brewer steering committee will include the following:
   - certify software for network operation
   - specify the requirements for calibration and maintenance for the global network
   - reference manuals
   - new developments
   - relationship to other total ozone monitoring systems
   - network operations including operating schedules
   - organizing meetings and training activities
   - promote communications with data centres
   - maintain contact with the Brewer manufacturer and service contractors
2. That the appropriate action be taken to hold the next Brewer workshop in conjunction with the QOS in Japan.
3. WMO should encourage as many Brewer operators as possible to submit 'raw' data (B-files and other required information) to the WOUDC.
4. To encourage the deposition of 'raw' data into the WOUDC, steps should be taken toward the establishment of a data exchange and security protocol for the inclusion of 'raw' data in the database.
5. After its formation, the Brewer steering committee should move quickly to resolve the issue of what Rayleigh scattering coefficients should be used to evaluate Brewer data. Brewer operators should be encouraged not to make this change until it can be done in a uniform manner.
6. WMO should recommend that the global UV-B total ozone routine (gi.rtn) and the collection of direct solar scan data be included in operational schedules throughout the network. The new data should be stored in the B-files.
7. The Brewer workshop members wish to express their disappointment at the closing of the scientific component of the Potsdam Observatory.
8. The Brewer workshop members expressed concern that the number of calibration and maintenance events conducted per year within the Brewer network has not increased sufficiently in response to past recommendations.
9. WMO should encourage all Brewer operators to collect and submit Umkehr data to the WOUDC for processing and analysis.
10. Brewer observations should be supplemented by pyranometer measurements performed using WMO-recommended devices.
11. The Brewer workshop participants endorsed the activities of the WMO UV steering committee in developing international UV calibration facilities.