Sun Scan SOP for the Brewer Spectrometer

The Canadian Brewer Spectrometer Network
Réseau Canadian de spectrophotometric – Brewer

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Version 2.0

Canada

Sun Scans – Brewer Spectrophotometer

Sun scans are performed to determine the optimal operating position of the diffraction grating(s) for taking ozone measurements. Sun scans essentially are used to confirm the wavelength calibration step number. Each individual scan is saved to the Bfile and the SC output average values are added to the SCOAVG.### file. A set of good sun scans taken between zenith angles of 48 to 66 degrees will provide useful information preliminary to an ozone re-calibration. BFilePro will use the sun scan data saved within the BFile.

Note: Environment and Climate Change Canada (ECCC) uses BfilePro to process the collected instrument data. BFilePro is a software created by International Ozone Services (IOS) Inc. ECCC has access to BFilePro via a license from IOS Inc.

Sun Scan Data Analysis

1. Double click on the BFilePro.exe icon to start the software and click OK to initiate the program.
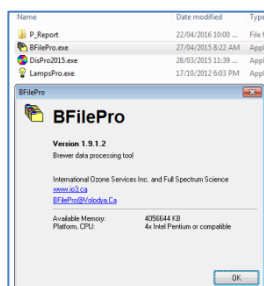
2. Click on the Graph tab.
3. Ensure that REC:ON is displayed. If OFF, double click this field to turn on.
4. In the main BFilePro window use the directory dialog field to navigate to the directory containing the B-files with sun scan data. Highlight a B-file with ozone scan data collected on a day with very little cloud coverage. Then click on the *Process* button.
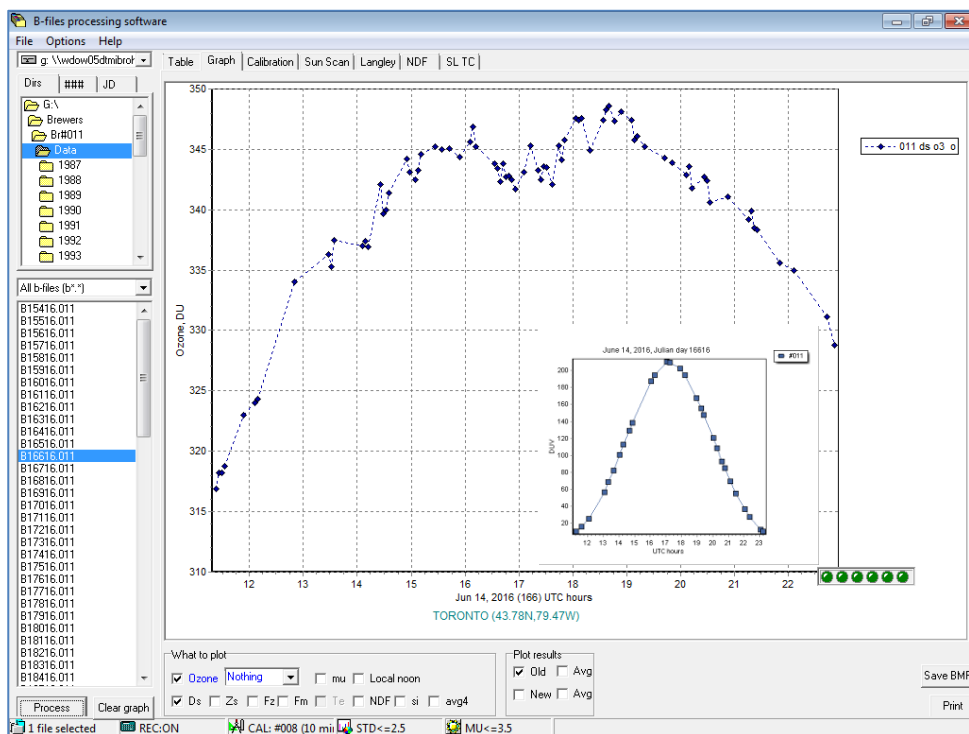
5. Next click on the *Sun Scan* tab and in the *Select instrument #* field area use the drop down arrow to select the Brewer being examined.

6. The sun scans will then populate the top graph area. Note: a red data point indicates an invalidated sun scan due to it missing an hg scan within 10 minutes of its completion.
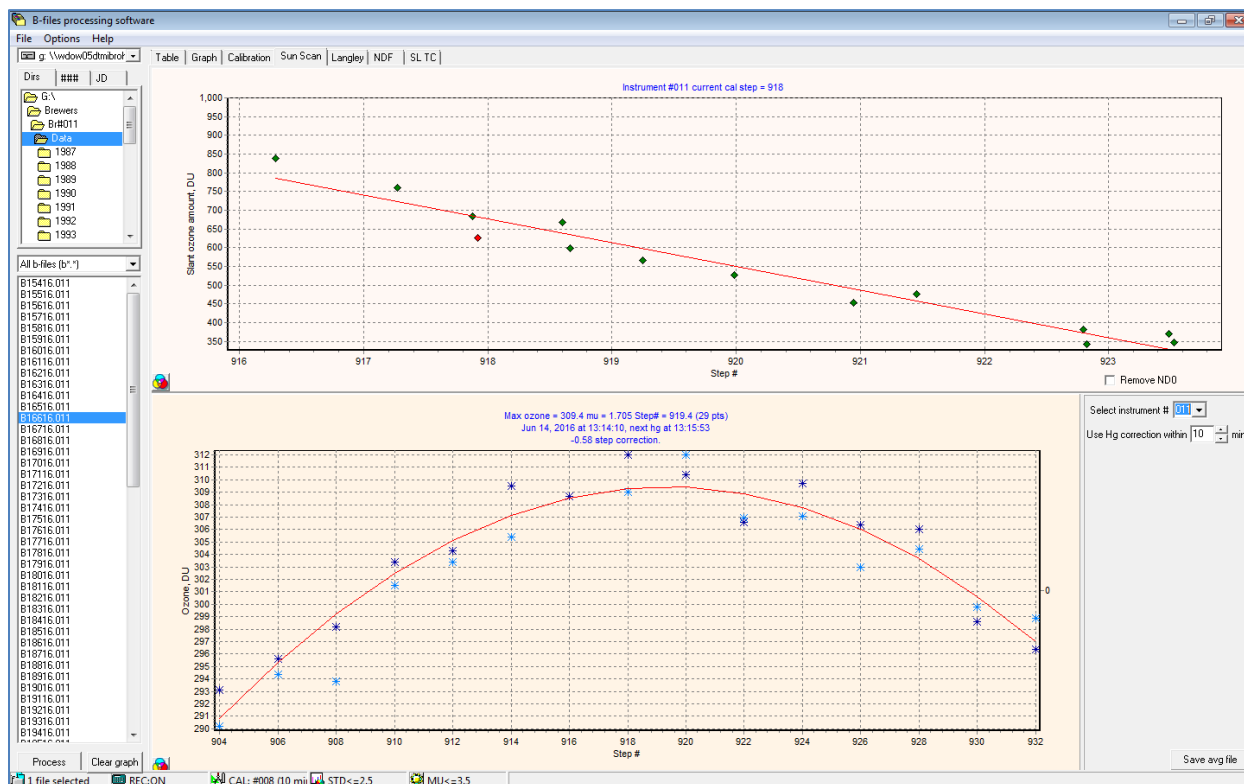

7. Initially these sun scans indicate a calibration step of 919 at 680 DU of slant ozone. However, the individual sun scan must be validated in the lower graph area before being included in the final slant ozone plot.

8. Using the computer mouse, place the cursor over a sun scan point in the upper graph and click the left mouse button to open this particular sun scan in the lower graphing area.

9. Note the step correction for this scan (i.e. -0.58 steps above) and if it is greater than |0.50| steps deselect the point by placing the cursor over this sun scan point and clicking the right mouse button. The data point will then turn white indicating its removal from the main plot. To add back this point re-click the right mouse button.

10. Continue this process until all sun scans have been examined.

11. Following the removal of invalidated sun scans, re-examine the remaining scans for step # vs ozone DU stability.

12. In the example below, the sun scan has a -0.41 step correction however, the step # vs ozone DU is scattered. The forward scans and return scans do not follow the red curve closely. Therefore this point should also be invalidated.
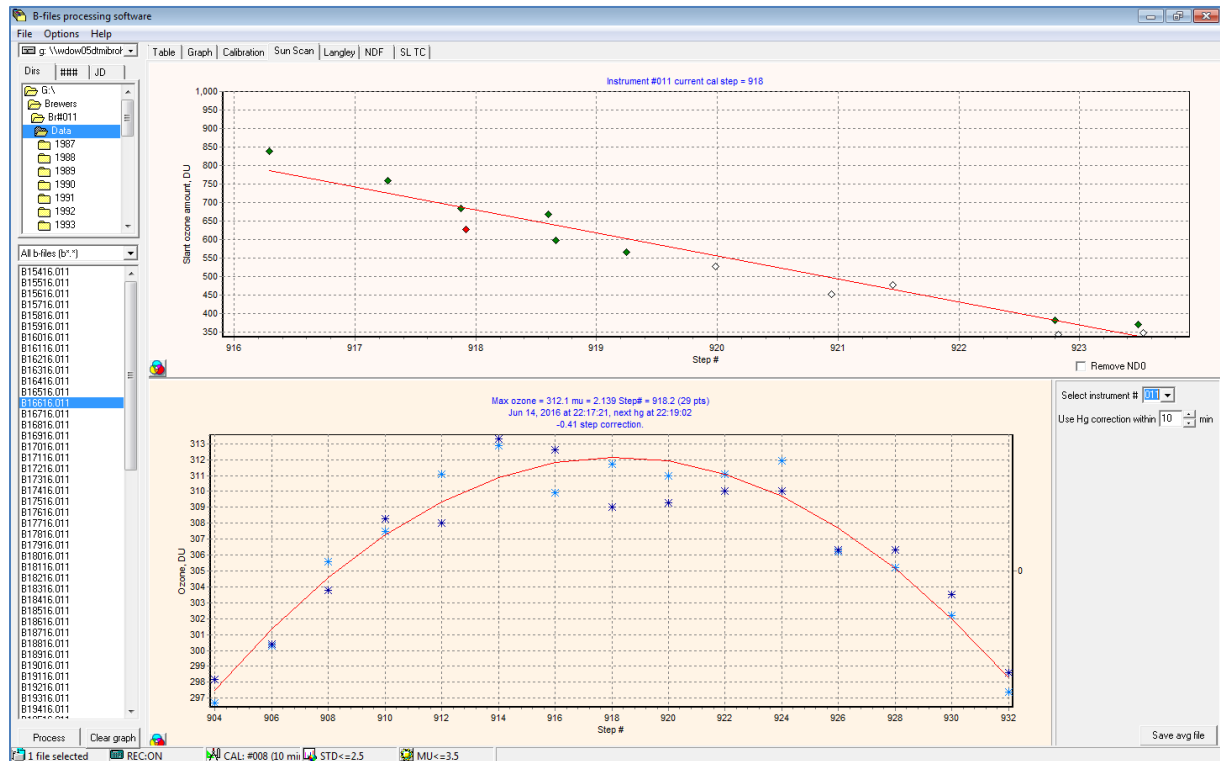
13. After validating the sun scans to be used in the slant ozone calibration line the plot may look like the following.
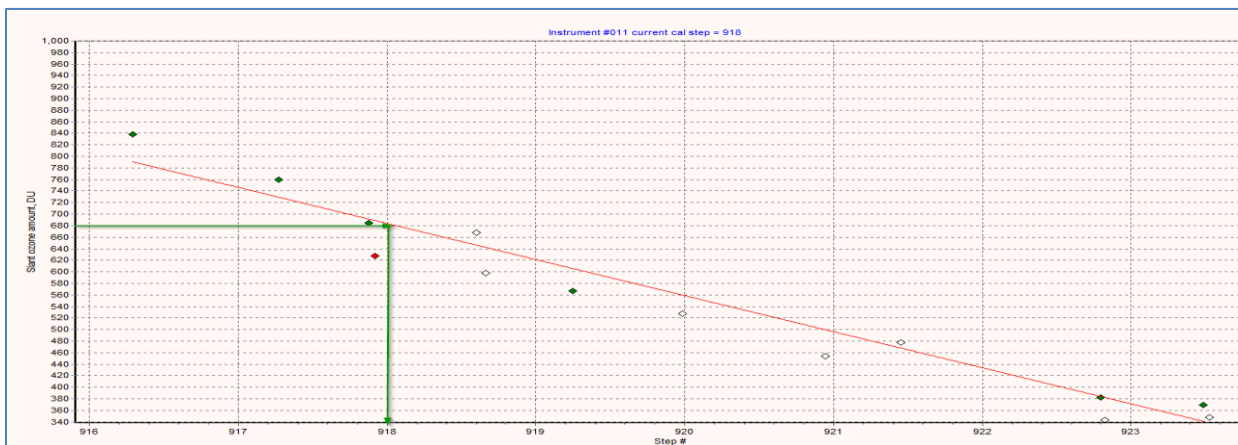
14. In this example Brewer #011's current calibration step is 918. The sun scans conducted on JD 16616 confirms this calibration step at 680 DU of slant ozone.

15. Note: results of other sun scan days may indicate a different calibration step at 680 DU, however if the difference is less than 2 steps no changes to the calibration step would be made.