Calibration Report:
Brewer #054, China – April 11-15, 2002

Introduction:

Ozone calibration on three Brewers from China was carried out at Haidain Region of Beijing during period April 11-15/02. This Brewer from Mt. Waliguan was last calibrated three years ago. The weather co-operated for parts of three days and comparative ozone measurements with the traveling standard Brewer #017 were made. The instrument appeared to have been well maintained with good quantity of desiccant inside but was having some problems noted below.

Ozone Calibration Results:

The instrument's constants in use were set at values from last calibration in 1999: ETC's = 3325/3300; absorption coefficients = 0.3471/1.1598. Using these constants the ozone results from #054 were low by ~1.5% compared to standard instrument #017. There were some very erratic ozone results due to poor operation of FW#2 the first two days. The instrument's standard lamp (SL) ratios R6/R5 were at 2075/3770 and ended at 2090/3800 which were nearly the same as in 1999. The constants were adjusted to 3300/3250 to produce more agreeable ozone and SO_2 results to the standard instrument.

After collecting some sun scan test results, the cal step for HG wavelength calibration was found need adjustment to 143 from step 139. This change in cal step position increased ozone ~1% starting near noon on day 103.

	day	O3	dev	SO2	dev	# / tot	mu	hr
#017 standard	10202	390.1	+4.7	0.9	+0.6	69/117	141	4
	10302	348.9	+4.0	3.3	+0.7	65/111	141	3
	10402	334.5	+1.4	1.2	+1.0	3/ 21	118	4
#054 final with ETC's = 3300/3250	10202	394.0	+21	-2.9	+3.9	52/ 77	150	3
	10302	348.2	+5.0	1.7	+2.2	34/ 77	142	3
	10402	335.2	+1.7	1.3	+1.6	7/ 68	120	3

UV Calibration checks:

UV calibration was completed with IOS Lamp #188 and local lamps 172, 173 and initial response file UVR10302.054 was created. The dome, diffuser and UV prism were cleaned and 4 step adjustments to ZE and UV motor constants. Then there was an approximately +2% improvement in sensitivity. New file UVR10402.054 was created for use. The new response file is ~6% larger than 1999 file. Reference processing results in files with (.log) extensions. The UV routine was changed due to maximum micrometer diode check failure at start of test which causes zeroing of micrometer before scan.

Dispersion test was done on HG and Cd lamps (5 lines) and new dispersion constants (ref file DCF10102.054) were made. These constants produce a four step difference at 3250 on slit 1 and so the new file is recommended for future use. Reference dispersion test processed results in file LVF10102.054 and graph of slit function.

Servicing:

Servicing included replacing FW#2 motor and lubricating pushrod bearing and zenith gear. Rubber seals under shock mounts and on cover lip were replaced. The cable to micrometer motor was replaced after problems were experienced. This instrument still has old style Hammond power supply.

The alignment of Hg lamp was found to be such that bright spot is 90 degrees off vertical and towards horizon out viewing window.

Recommendations and Software Changes:

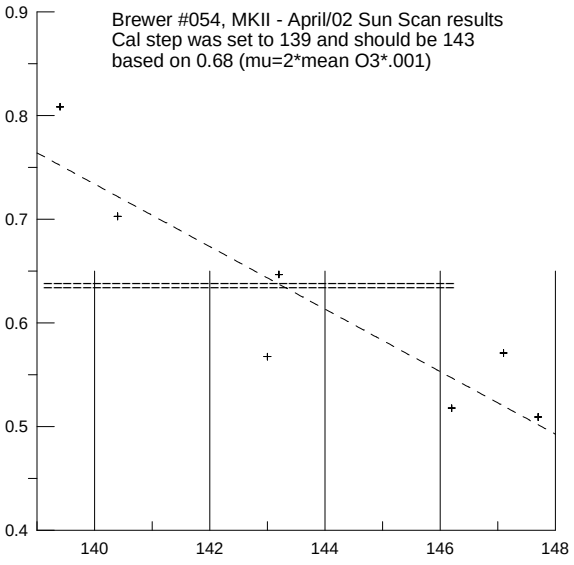
1. Operating Software changes made included: main program (main.bas) was upgraded to V3.7c+ which has added display features in screen box and will not change computer date. IOS program setdate.exe added to operate just before Brewer programs are started. Setdate reads the date from computer and

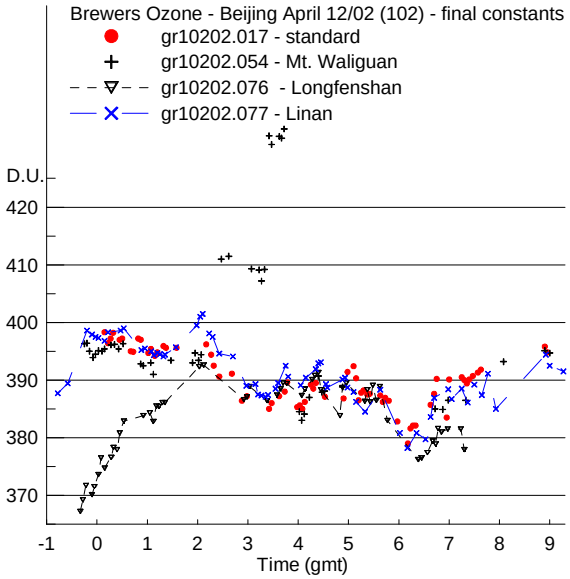
records it into op_st.090 file along with setting A/D option to ON. New QL routine added which could be used in place of QS and UL for monitoring UV stability. The UV routine that was in use should be replaced with latest version due to failure of micrometer check on maximum diode.

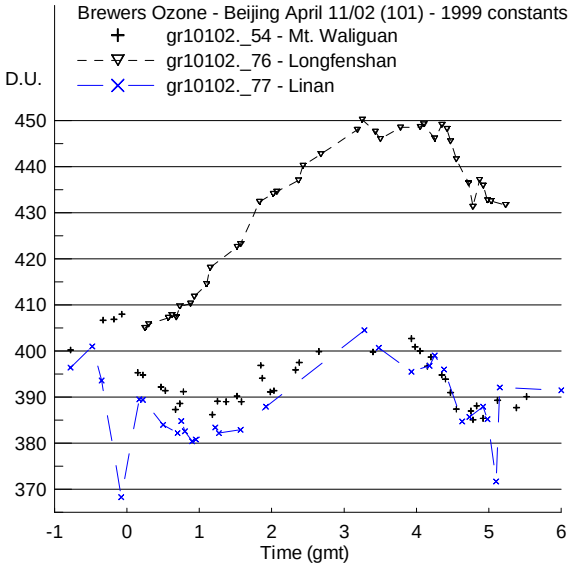
2. When the Hg lamp is changed in the future the present alignment (90 degrees) should be maintained.

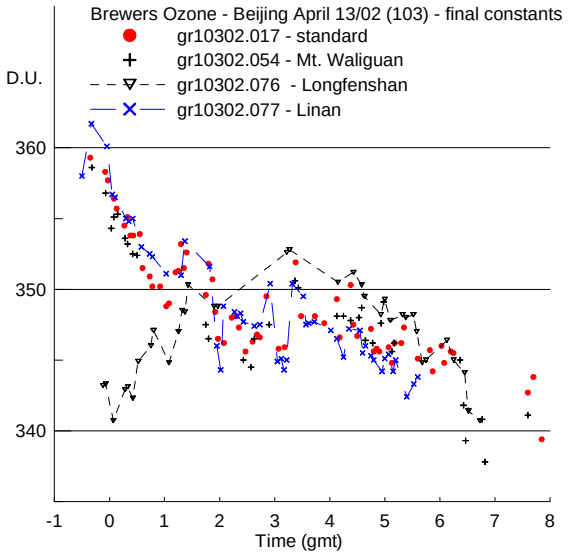
Graphical Results:

Below are graphs for #054. The sun scan test results, which show that step 143 is now the proper wavelength cal. Some ozone results are plotted as well below.

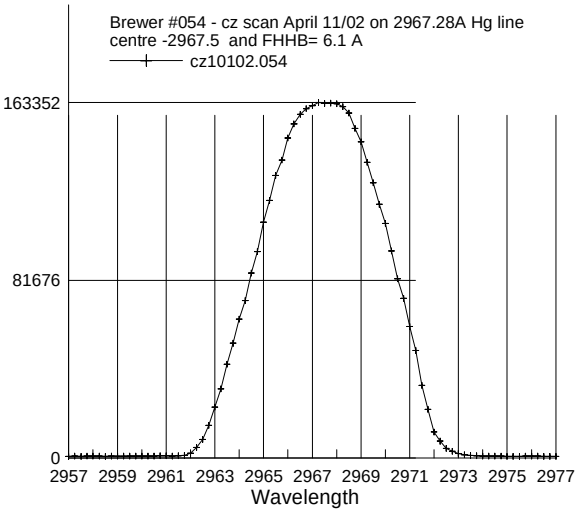


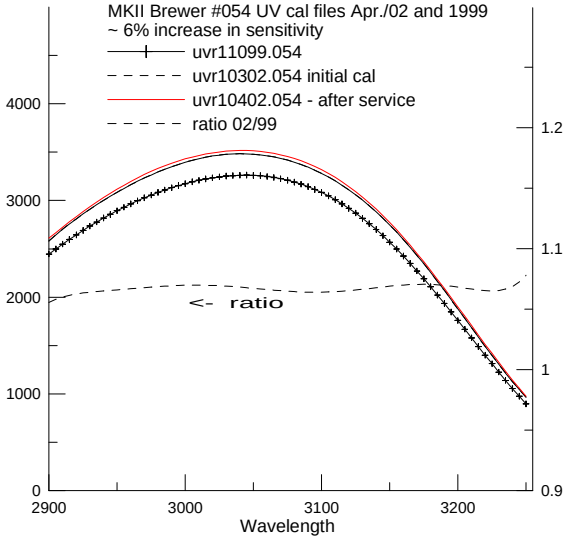






Below are graphs of slit function - scan of 2967 mercury lamp spectral line and Standard Lamp scan test results.





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