

**Calibration Report:
Brewer #077, 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 Linan was last calibrated in Canada two 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 however is believed to have suffered transportation shock that shifted the shutter motor assembly.

Ozone Calibration Results:

The instrument's constants in use were set at values from last calibration in 2000: ETC's = 2625/2450; absorption coefficients = 0.3421/1.1475. Using these constants the ozone results from #077 were low by ~2 % compared to standard instrument #017. It was noted also that the DT and RS tests were poor. The shutter motor operation was found to be the reason and so it was re-aligned properly to slits on day 101. The instrument's standard lamp (SL) ratios R6/R5 were at 1410/2830, and that was a change of +50/+110 from 2000 calibration. The constants were adjusted to 2585/2420 to produce more agreeable ozone and SO₂ results to the standard instrument or a change of (-40/-30). This performance is unusual but the final comparison results are very good now.

	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
#077 final with ETC's = 2585/2420	10102	396.0	+9.1	4.0	+2.2	29/ 52	151	3
	10202	391.2	+5.2	1.4	+1.0	67/107	147	4
	10302	348.8	+4.6	3.1	+0.7	51/ 80	136	3
	10402	335.8	+2.2	0.6	+0.4	7/ 30	118	4

Other Calibration checks:

Dispersion test was done on HG and Cd lamps (5 lines) and new dispersion constants (ref file DCF10402.077) were made. These constants produce up to a ten step difference at some wavelengths and so the new file is recommended for future use. Reference dispersion test processed results in file LVF10402.077 and graph of slit function.

After collecting some sun scan test results, the cal step for HG wavelength calibration was found to be proper at step 294.

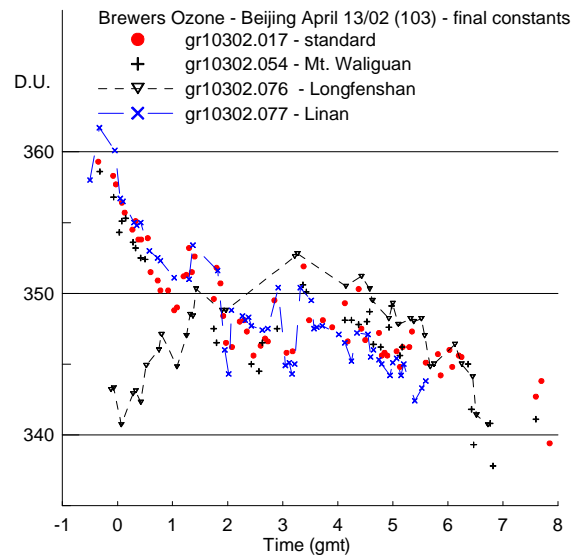
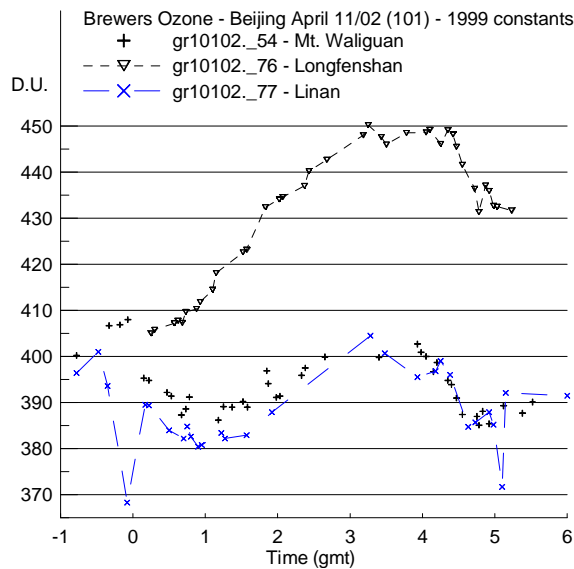
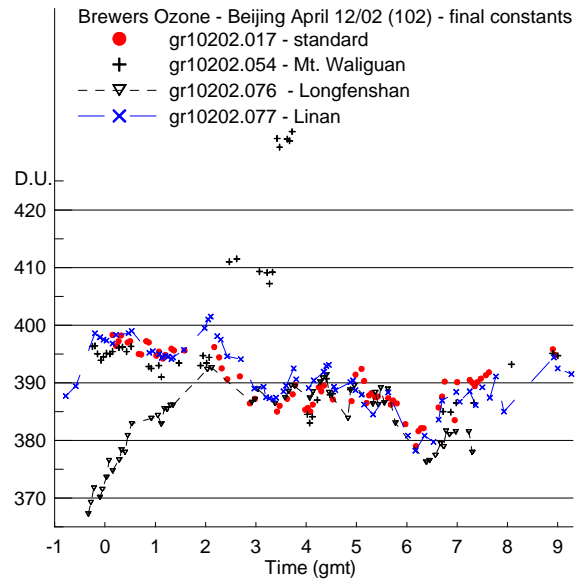
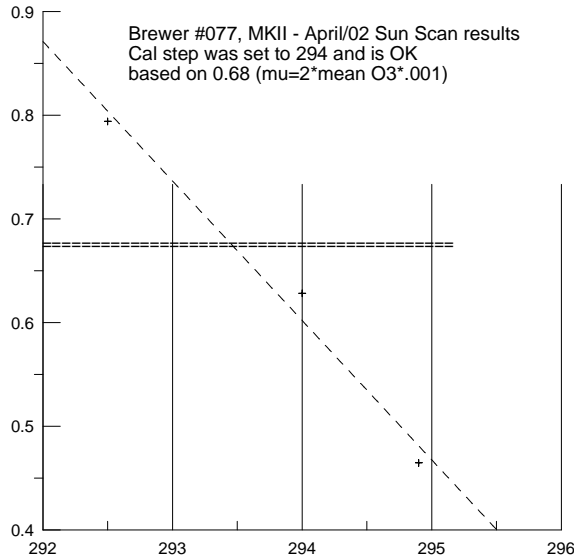
Servicing:

Servicing included re-locating shutter motor in its mount and re-aligning to slits. Also lubrication of pushrod bearing and zenith gear was done. Rubber seals under shock mounts were replaced which should reduce humidity.

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.
2. Adding extra foam rubber inside Brewer – on top of control panel and below spectrometer is recommended before shipping Brewer to reduce movement of instrument inside on shock mounts.

Below are graphs for #077. The sun scan test results show that step 294 was still proper wavelength cal. Some ozone results are plotted as well below. The ozone results shown for day 101 are with initial constants and the agreement to #054 was reasonable. Traveling standard #017 was not available until the next day due to delay in shipping. The graphs for days 102 and 103 are using final constants and #077 shows good agreement with #017.



Below are graphs of slit function - scan of 2967 mercury lamp spectral line and Standard Lamp scan test results. The slit function is normal and the difference in standard lamp scans is not well understood. The scan from 2000 was probably done before final adjustments were made.

