Update on the Calibration and System Upgrades of the NOAA GRAD UV Monitoring Networks

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The Antarctic UV network's long-term calibration traceability was improved this austral summer season with the inclusion of two new 200 Watt reference lamp standards. With generous collaboration from Biospherical Instruments, San Diego, California the calibration traceability back to the NIST 1990 irradiance scale has been reinforced with the addition of the new lamps and operation methodology. The additions increase the total number of lamps at all three stations to five. One of the new reference lamps is run annually and the other biennially against the three station calibration lamps. A sixth traveling standard is used to compare to the five stations lamps during the biennial site visit. Our goal is to improve the relative calibration uncertainty from the current +/-2% to +/-1%.

In 2014 the U.S. continental NEUBrew Brewer spectrophotometer network underwent a facelift, so to speak. During the summer of 2014, closing spectral UV calibrations were performed on all network Brewers prior to transferring them from their respective field sites back to Boulder for refurbishment. The instruments, which are almost 20 years old were in need of maintenance, repairs, and upgrades. For diagnostics and stability tracking, each Brewer scans its internal QTH reference lamp daily and the intermediate MS(9) value (normally determined from solar measurements) for calculating total column ozone is determined. This internal value is referred to as R6. The weighted double ratio (R6) is used to track the spectral stability of the Brewer and in turn its ozone calibration. We use the R6 value to adjust the Brewer's ozone ETC (calibration) on a daily basis. Early results of replacing the original nickel-sulfate combination filter with the new type of solar blind filter are shown in Figure 2 for Brewer 154. The stability of the new filter is remarkable when compared to data taken from Brewer 154 prior to installing the new filter. The initial results show that the new filter has improved the ozone calibration stability. The improvement should also transfer to the long-term spectral UV calibration stability, which will become more apparent after multiple annual calibrations.

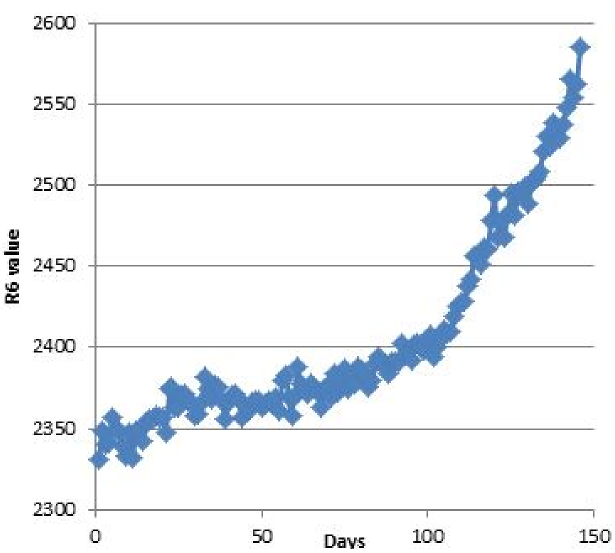

Figure 1. R6 time series for Brewer 154 before the new solar blind filter was installed. For comparison, note the spectral stability of the instrument after the new filter was installed as shown in Figure 2. The time series runs from January 1, 2014 to May 31, 2014.

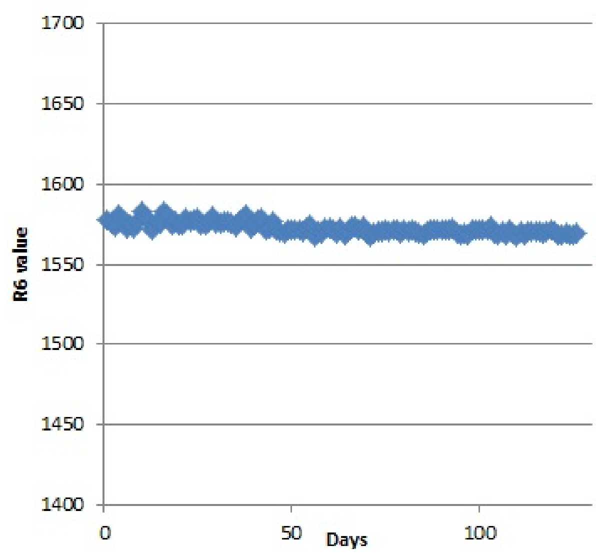

Figure 2. R6 time series for Brewer 154 after the new combination solar blind filter was installed. Brewer 154 is located at the University of Houston. The vertical scale if Figure 1 and Figure 2 are the same. The R6 values are from November 1, 2014 to March 31, 2015.