

## Long-Term Stability of Rev Q. UV Multifilter Rotating Shadowband Radiometers, Part 4: Lamp Calibrations Versus the Langley Method

G.T. Janson<sup>1</sup>, J.R. Slusser<sup>1</sup>, B. Hundermark<sup>1</sup>, P. Disterhoft<sup>2</sup>, and K. Lantz<sup>2</sup>

<sup>1</sup>UV-B Monitoring and Research Program, Colorado State University, 419 Canyon Ave, Suite 226, Fort Collins, CO 80521; 970-491-3621, Fax: 970-491-3601, E-mail: georgej@uvb.nrel.colostate.edu

<sup>2</sup>Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO 80309

In this study, we compare two different calibration methods on a UV multi-filter rotating shadow-band radiometer (UV-MFRSR). The UV-MFRSR contains seven nominal 2-nm bandwidth filters at 300, 305, 311, 317, 325, and 368 nm. This study is limited to Rev. Q UVMFRSR instruments that were modified in the five longest wavelength channels from Gallium Phosphide photodiode detectors (GaP) to Silicon photodiodes (Si), i.e. nominal wavelength channels 311, 317, 325, 332 and 368 nm. The 300 and 305 channels have always used Silicon-Carbide (SiC) photodiodes. This is an on-going study that was begun by Dave Bigelow and James Slusser of the UV-B Monitoring and Research Program (UVMRP). Their initial research studied only a few UV-MFRSR instruments over a limited in-service time span [J. Geophys. Res., 105, 4833-4840, 2000]. The conversion of the photodiode detectors to Si gave rise to an unanticipated error in the lamp calibration data due to out-of-band (OOB) sensitivity of the new Si photodetectors to longer wavelengths. The Central UV Calibration Facility (CUCF) has developed a procedure to detect for the out-of-band light leakage. The CUCF has provided the UVMRP with corrected calibration data files for the out-of-band light. Calibration data from 2001 through 2006 for 47 UV-MFRSR instruments has been analyzed using non-OOB-corrected calibration files and with OOB-corrected calibration files. This analysis compares lamp-determined and Langley-determined values for each of the 47 UV-MFRSR instruments. For the Rev.Q version of the UV-MFRSR instruments, the overall mean comparisons for OOB correction are: 1.01 for 311 nm, 1.01 for 317 nm, 1.00 for 325 nm, 0.99 for 332 nm and 0.94 for 368 nm. The anomalies of 1.38 for 300 nm and 1.05 for 305 nm will be explored at a later date.

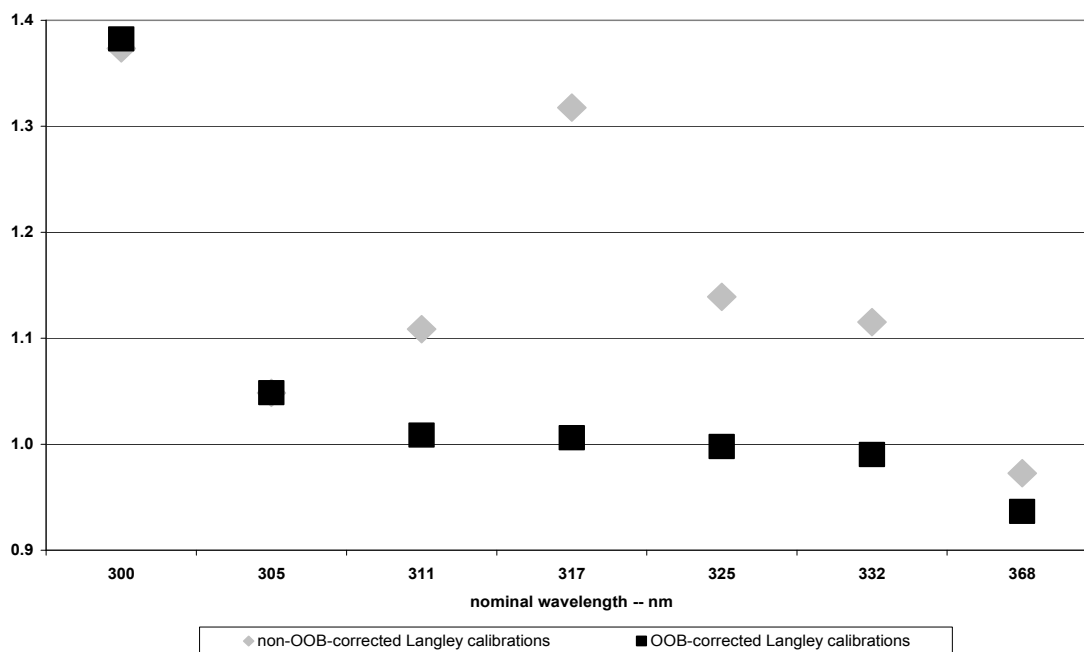


Figure 1. Comparison of Langley calibrations to the OOB-corrected lamp calibrations.