ReadMe file for data processing information pertaining to:
Chesapeake Light Tower (CLT) Satlantic 13 channel MultiSAS data from 1/27 to 12/4/06
Julian dates 2006-027 to 2006-338.

TITLE: MultiSAS Es calibration issues 2006

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Calibration Overview:

This document deals with the calibration issues of the Es sensor of our Satlantic 13 channel MultiSAS (serial number 004, sensor mvd056), for data collected between 1/27/06 and 12/4/06. The Es sensor was calibrated before (mvdM.cal) and after (mvdN.cal) deployment on the Chesapeake Light Tower. The post-calibration (N) showed that the sensor had experienced significant drift due to weathering. Figure 1 shows the calibration coefficients for the pre and post calibrations, wavelengths 490, 510, 532, 555, 666 and 683 nm in particular were subject to the greatest deviation from the initial calibration. Figure 2 shows the drift in these coefficients as a percentage of the post cal. Channel 443 nm had a drift of less than 1%.

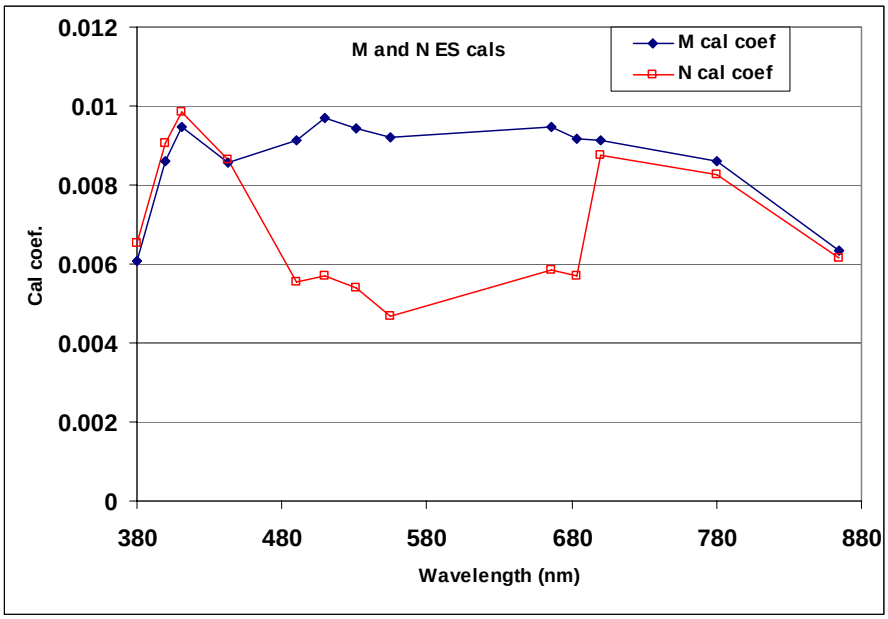

Figure 1. M and N calibration coefficients.

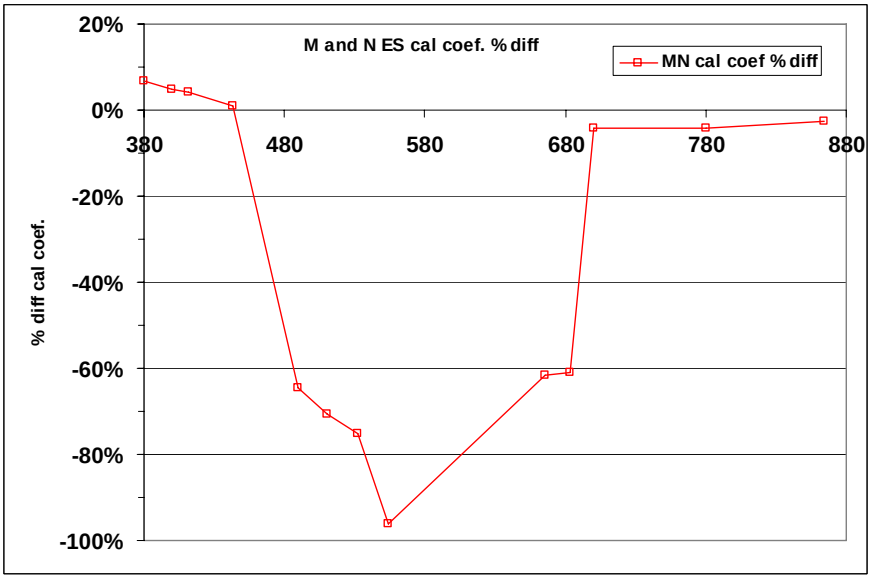

Figure 2. Percentage of drift between pre and post calibration coefficients during the MultiSAS deployment.

The result of the drift from the initial calibration means that the Es sensor data when processed with the M calibration towards the end of the deployment does not provide the correct Es spectra. This is seen when compared to data from another co-located Es sensor (Figure 3).

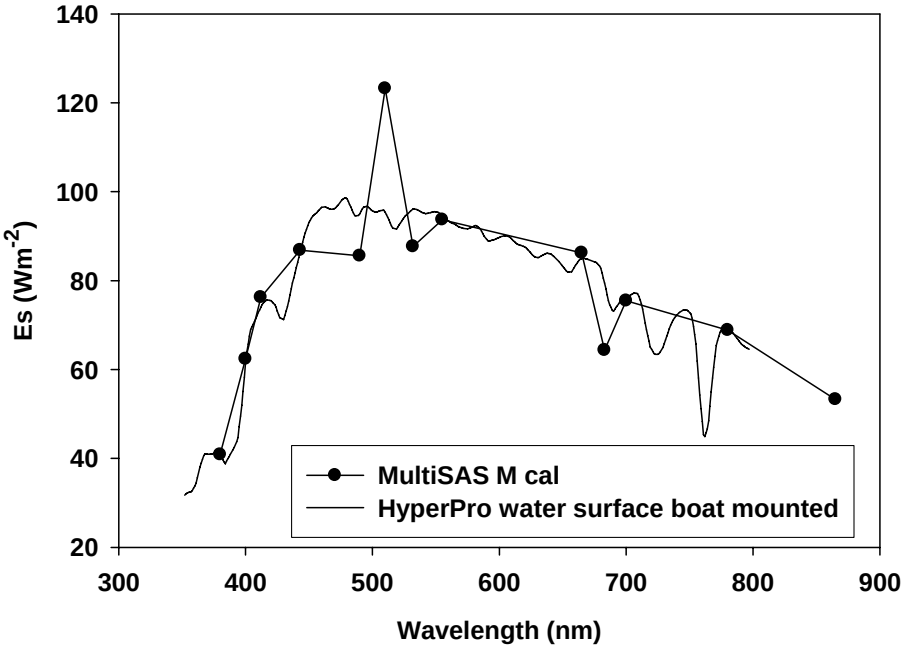

Figure 3. Comparison of Es spectra from the end of the MultiSAS deployment (2006-314) processed with the M cal with Es spectra from a boat mounted HyperPro Es sensor, measurements taken coincidently.

Although a post-cal (N) was performed, the drift of the instrument was not constant and so finding a point at which to start to apply the N cal to the data was problematic. Since the 443 nm channel did not suffer a significant drift during the deployment, it was used as a basis for correction of those channels which did change significantly. In this solution it was assumed that the shape of the Es spectra is generally constant. Those channels which showed a drift of greater than 10% over the course of the deployment were adjusted (490, 510, 532, 555, 665, and 683). The ratio of 443 nm to the channels that were to be corrected was calculated from the first 30 days of the deployment in which sensor drift was not present.

Es M cal corrections based on Es443 using equation 1

$Es(\lambda) = Es(443) * \text{fixed ratio}(\lambda)$ Eqn 1.

490	1.059658937
510	1.065522020
532	1.044607205
555	0.971252190
665	0.871777624
683	0.792310603

These ratios were then applied to data from 2006-168 to 2006-338.

This correction was applied to the MultiSAS data and the resulting spectra were then compared to the Es spectra from a co-located HyperPro.

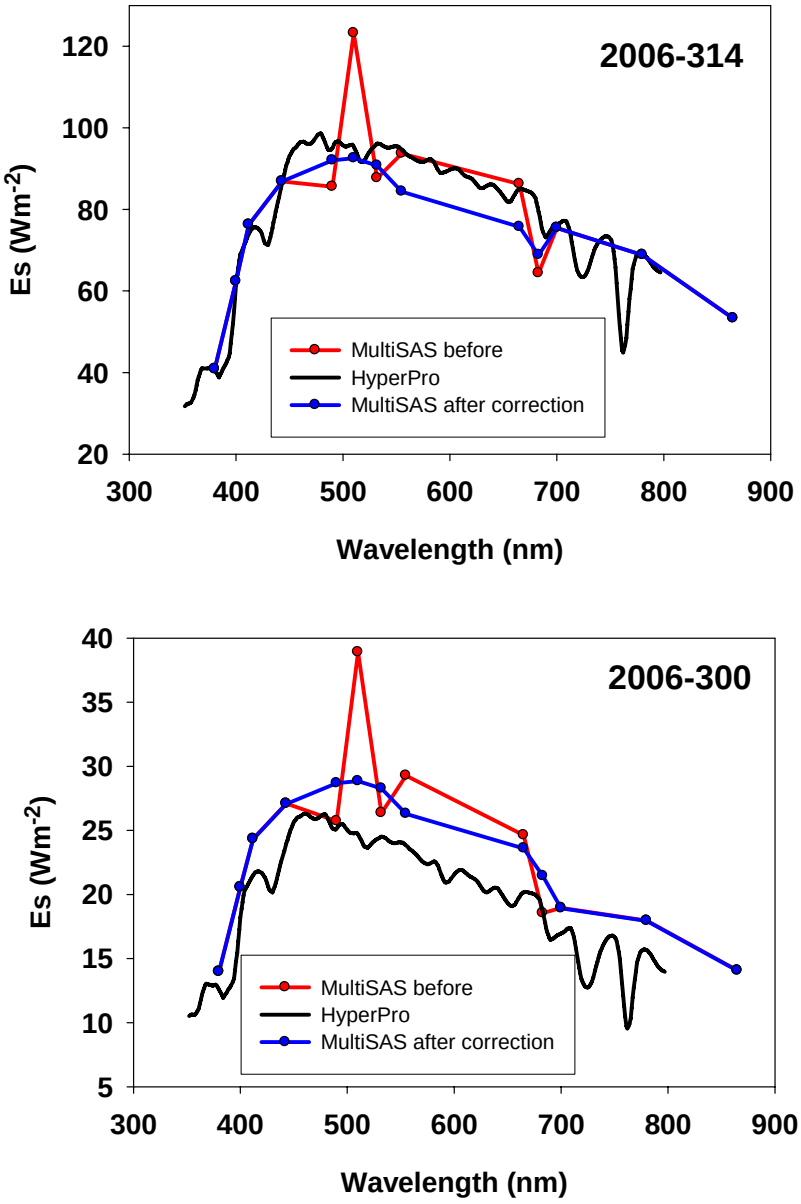

Figure 4. Comparison of MultiSAS Es spectra before and after correction, and the co-located HyperPro Es spectra.