ReadMe file for data processing information pertaining to:
Chesapeake Light Tower (CLT) Satlantic 13 channel MultiSAS data from 4/12/04 to 6/8/05
Julian dates 2004-103 to 2005-159.

TITLE: MultiSAS Es calibration issues 2004-2005

AUTHORS:

Dr. Victoria J. Hill
Department of Ocean Earth and Atmospheric Science, ODU
4600 Elkhorn Ave
Norfolk VA 23529
757.683.4911 (tel)
757.683.5303 (fax)
email vhill@odu.edu

Data questions contact:

David A. Ruble
OEAS – ODU
4600 Elkhorn Ave
Norfolk VA 23529
757.683.3281 (tel)
757.683.5303 (fax)
email druble@odu.edu

FUNDING SOURCE AND GRANT NUMBER: NASA–NNG04GN77G

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 8/6/04 and 6/8/05. The Es sensor was calibrated before (mvd056K.cal) and after (mvd056L.cal) deployment on the Chesapeake Light Tower. The post-calibration (L) showed that the sensor had experienced significant drift due to weathering. Figure 1 shows the calibration coefficients for the pre and post calibrations, wavelengths 380, 400, 412, 443, 510, and 555 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 490 nm had a drift of less than 1%.

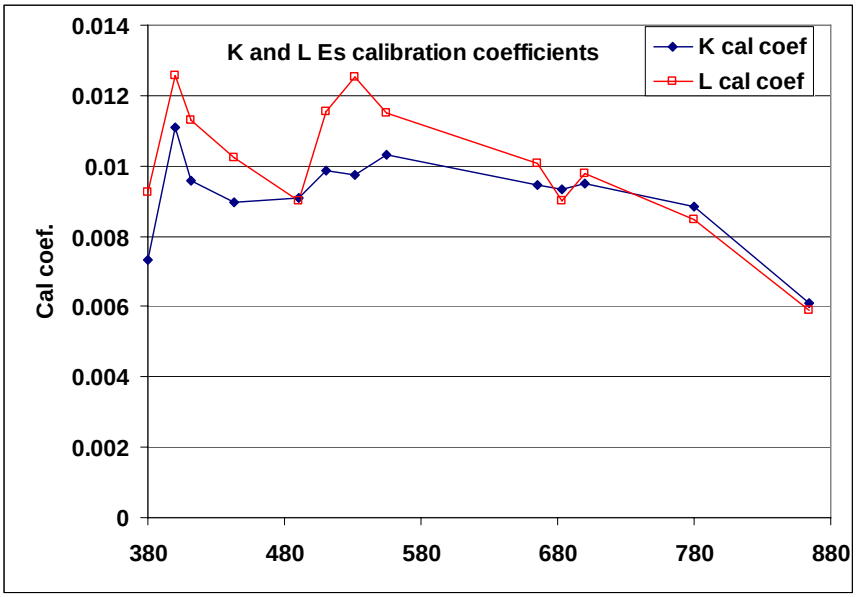

Figure 1. K and L calibration coefficients.

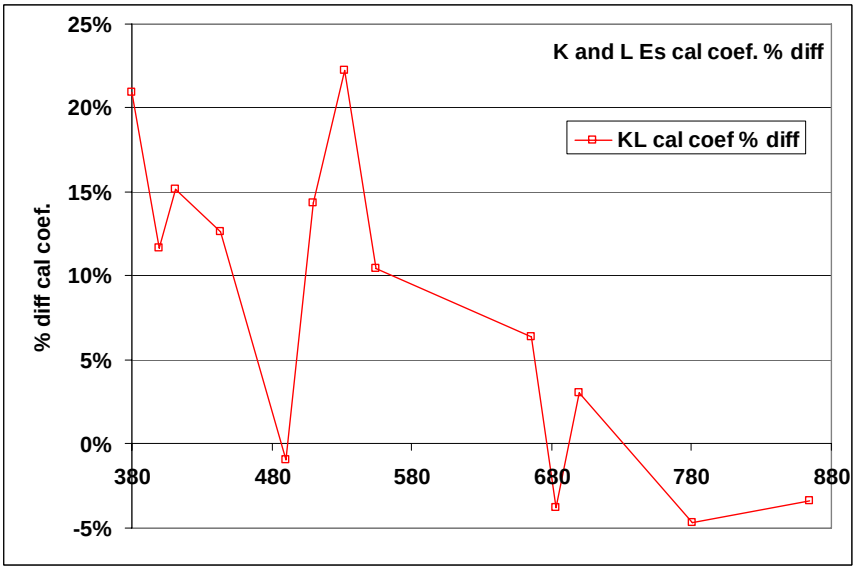

Figure 2. Percentage of drift between pre and post calibration coefficients during the MultiSAS deployment.

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

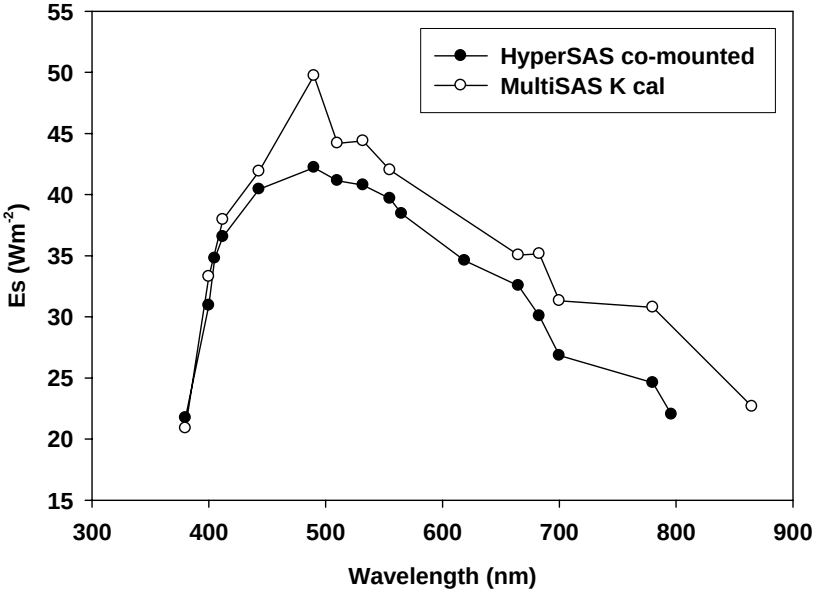

Figure 3. Comparison of Es spectra from the end of the MultiSAS deployment (2005-126) processed with the K cal with Es spectra from co mounted HyperSAS sensor.

Although a post-cal (L) was performed, the drift of the instrument was not constant and so finding a point at which to start to apply the L cal to the data was problematic. Since the 490 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 (412, 443, 510, 555 and 683). Although channels 380 and 400 nm had a drift of over 10% between the initial and post calibration, there was little drift in these channels relative to 490 nm. The ratio of 490 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 K cal corrections based on Es490 using equation 1

$Es(\lambda) = Es(490) * \text{fixed ratio}(\lambda)$ Eqn 1.

412	0.857837000
443	0.953001000
510	1.013230000
532	1.000150000
555	0.924472697
683	0.753618902

These ratios were then applied to data from 2004-219 to 2005-159.

This correction was applied to the MultiSAS data and the resulting spectra were then compared to the Es spectra from a co-mounted HyperSAS which was deployed during the last 59 days of the MultiSAS deployment. Figure 3 shows the comparison between MultiSAS Es spectra before and after correction and the co-mounted HyperSAS Es sensor.

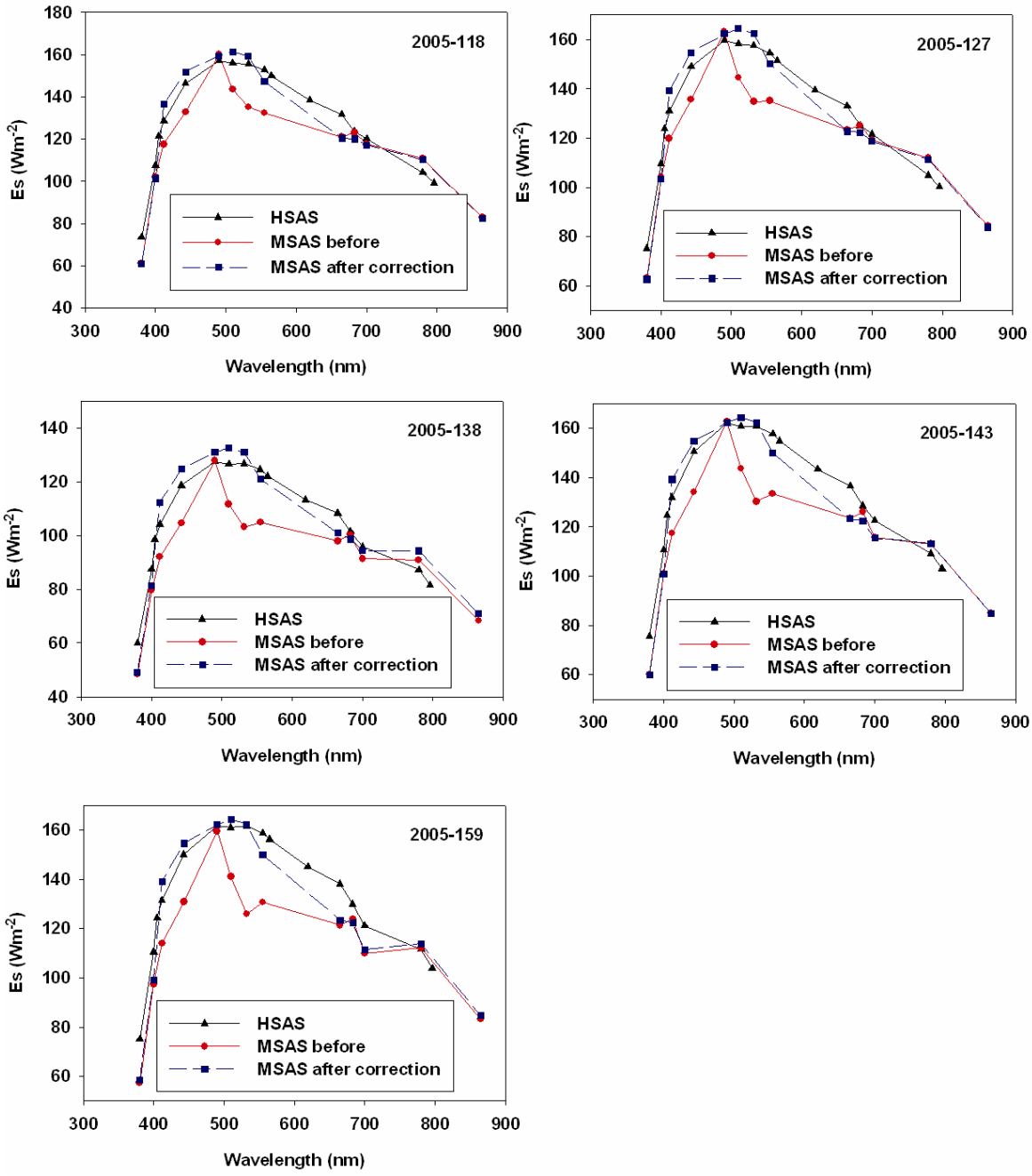

Figure 3. Comparison of MultiSAS Es spectra before and after correction, and the co-mounted HyperSAS Es spectra.