"Current Status of MOBY Data Products"

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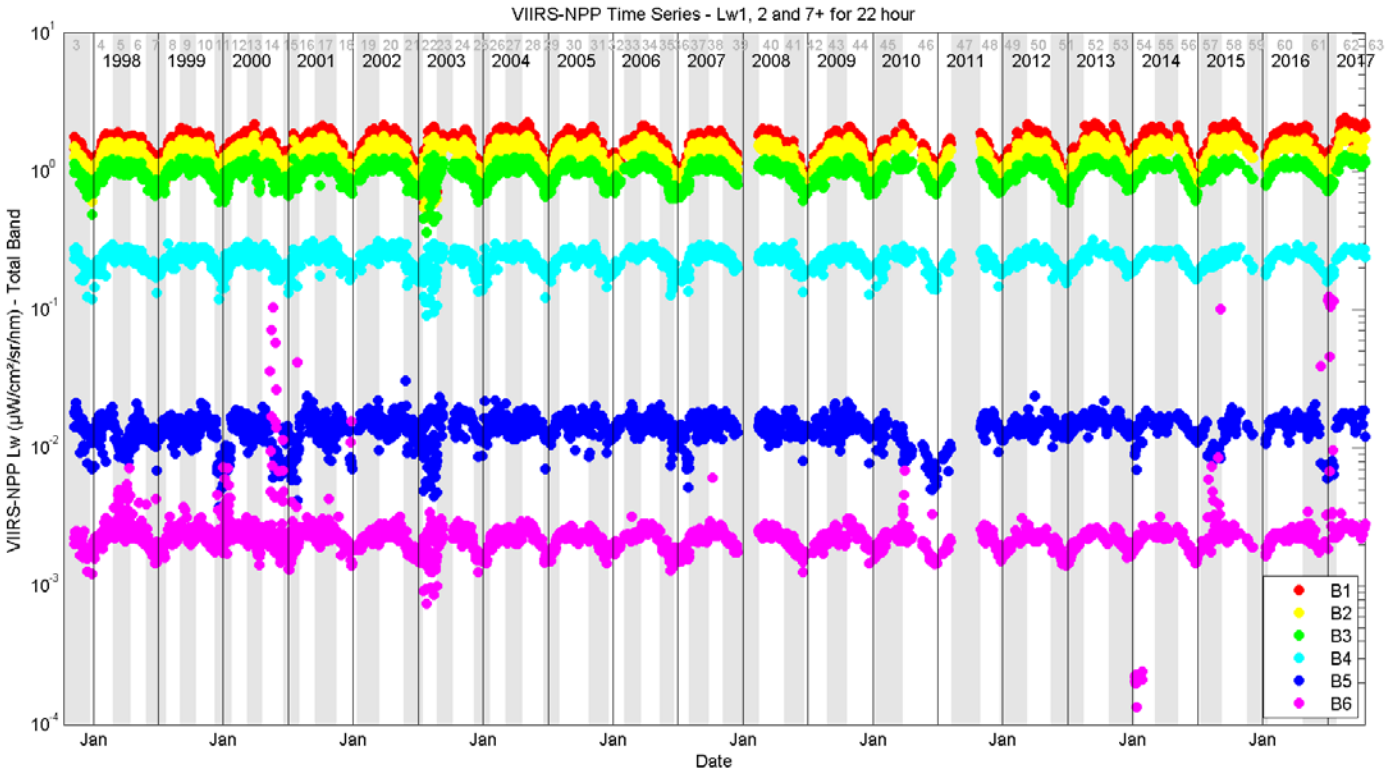
1) Brief statement on current status of MOBY Operation and Refresh

2) Explanation of M261 post calibrated data posting

3) Description of corrections we are working on implementing in the data stream.

Currently have a 20 yr. time series of vicarious calibration data at the MOBY site thanks to NASA, NOAA, Dennis Clark, and the rest of the MOBY team (many of whom have been in the project since the beginning).



Current status

- Deployment M263 started approximately 8/2.
- Currently working through controller issues, but the data is looking good. Getting 22 hr and 00 hr(or 23hr) files each day, but not 20 hr file, working on understanding why.
- We are on our third deployment of the new Blue spectrometer system. We are learning and testing for the optimal acquisition and data reduction procedures for this new system.

As might be recalled, M261 was a deployment that had several issues. At the beginning the pre-calibration for the mid arm was suspect, so we did not use the midarm measurement and only produced and posted the product Lw2 which uses the top arm and the bottom arm.

Mid deployment the top arm was broken off, and we were then forced to make a new product which used the lower arm measurement, and an empirical, seasonal KL to propagate this to the surface. This product was called Lw14

With the post-calibrations we found that we could recover the midarm measurement after the arm had been damaged, but this did not propagate backwards beyond this point (other calibrations must have been effected when the collision that broke the arm occurred).

Taking all of this into account, we have replaced the data on the data directory with the post calibrated data.

This post calibrated data has two “epochs”:
1) the time period before the top arm was broken off uses the top and bottom arm, with the precalibrations to produce Lw2 and Lwn2. (and associated Lw22 and Lwn22 for wavelengths greater than 575 nm).

2) the time period after the top arm was broken off will use post calibrated mid arm and lower arm data to produce the Lw7 and Lwn7 product (and associated Lw27 and Lwn27 for red wavelengths).

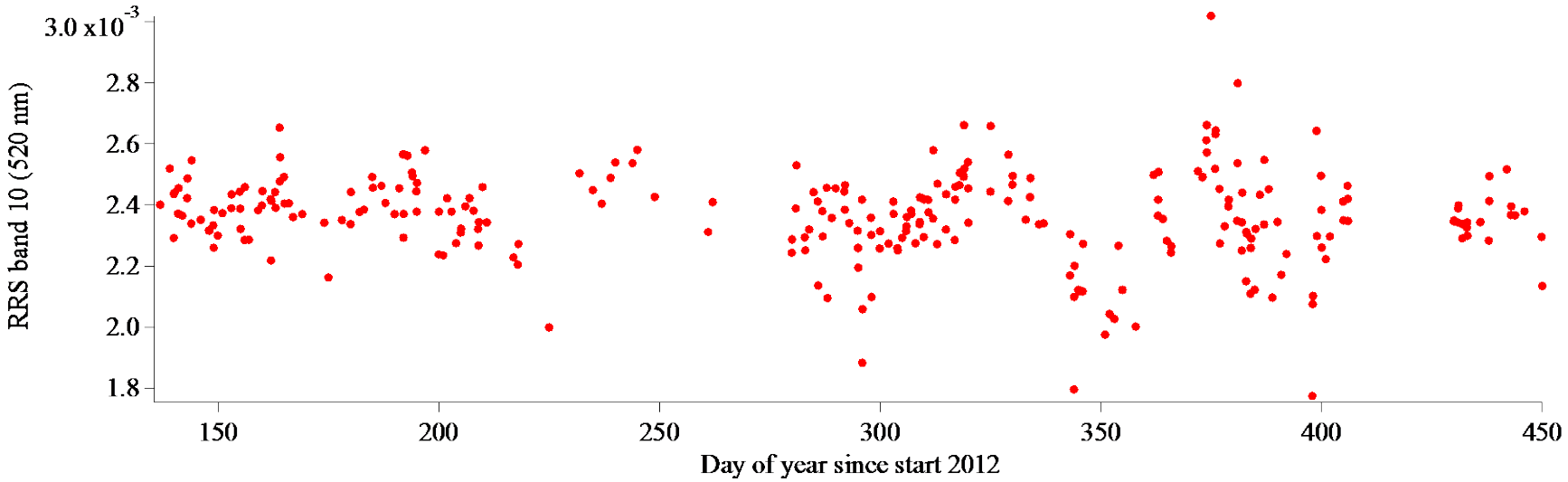
IMPORTANT: Note that with the post cal, we have taken down data the Lw14 product that was produced during the deployment to give “real time” data. Also, now that we have midarm and lower arm data, thus a real KL measurement to evaluate, some days have changed their quality designation (good, bad or questionable).

We are working on ways to improve the accuracy of the MOBY data product, along with doing a better assessment of the environmental induced uncertainties in the data products.

Some of the factors, that we can model, include tilting of the Es collector, the BRDF effect and tilting the radiance collector, tilt of the buoy changing the Lu measurement depth, and possibly the biggest, instrument self-shadowing.

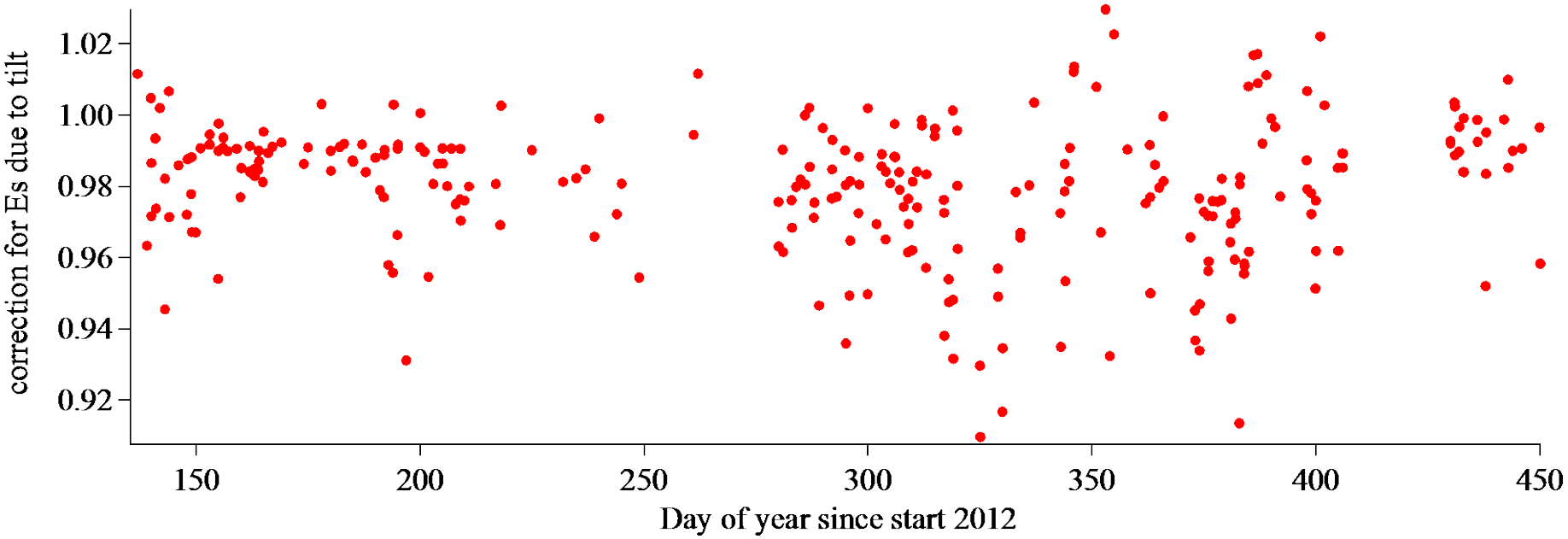
We can evaluate each of these individually and look on the effect on the data. To investigate an apparent optical property, rather than a radiometric property, we will look at the remote sensing reflectance, RRS = Lw/Es during two deployments in 2012/2013.
I will select RRS 520 nm, as it should be fairly stable.

RRS(520 nm) for the two deployments in 2012-2013

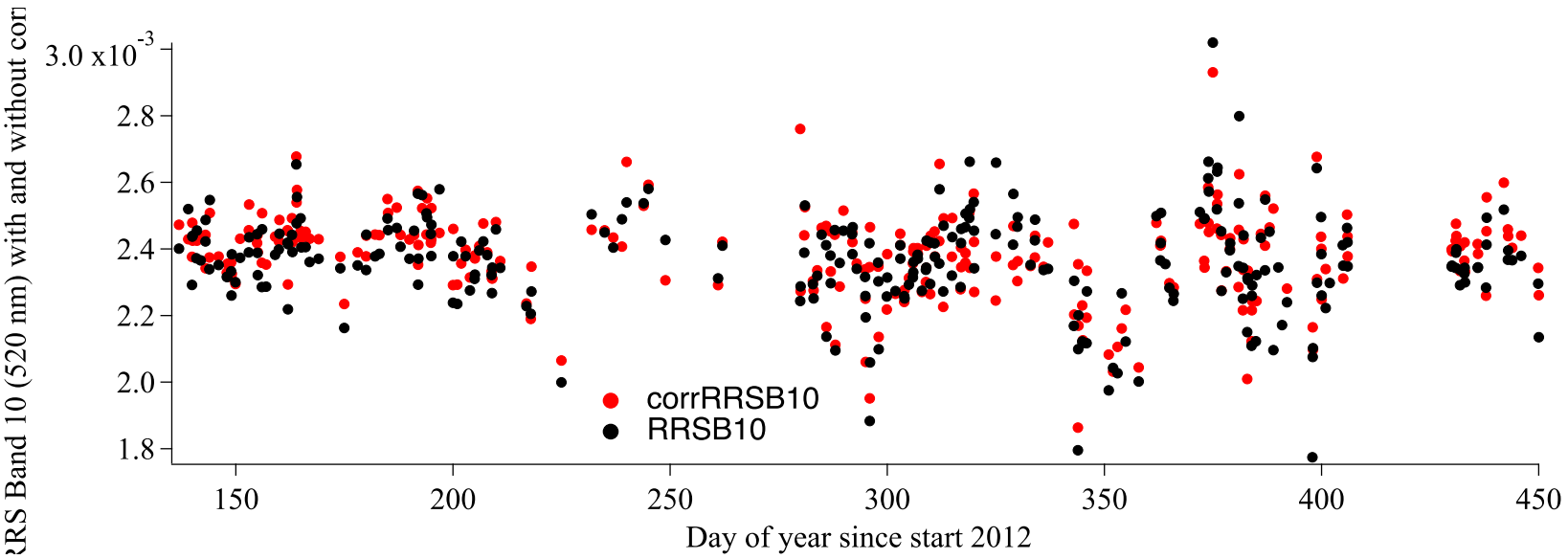


Mean is 0.0024, while the COV is 6%

The correction for irradiance collector tilt (and actual cosine response) is shown below. As can be seen, this correction (for the most part less than 1) can be a significant effect, although it is also generally less than 2%.

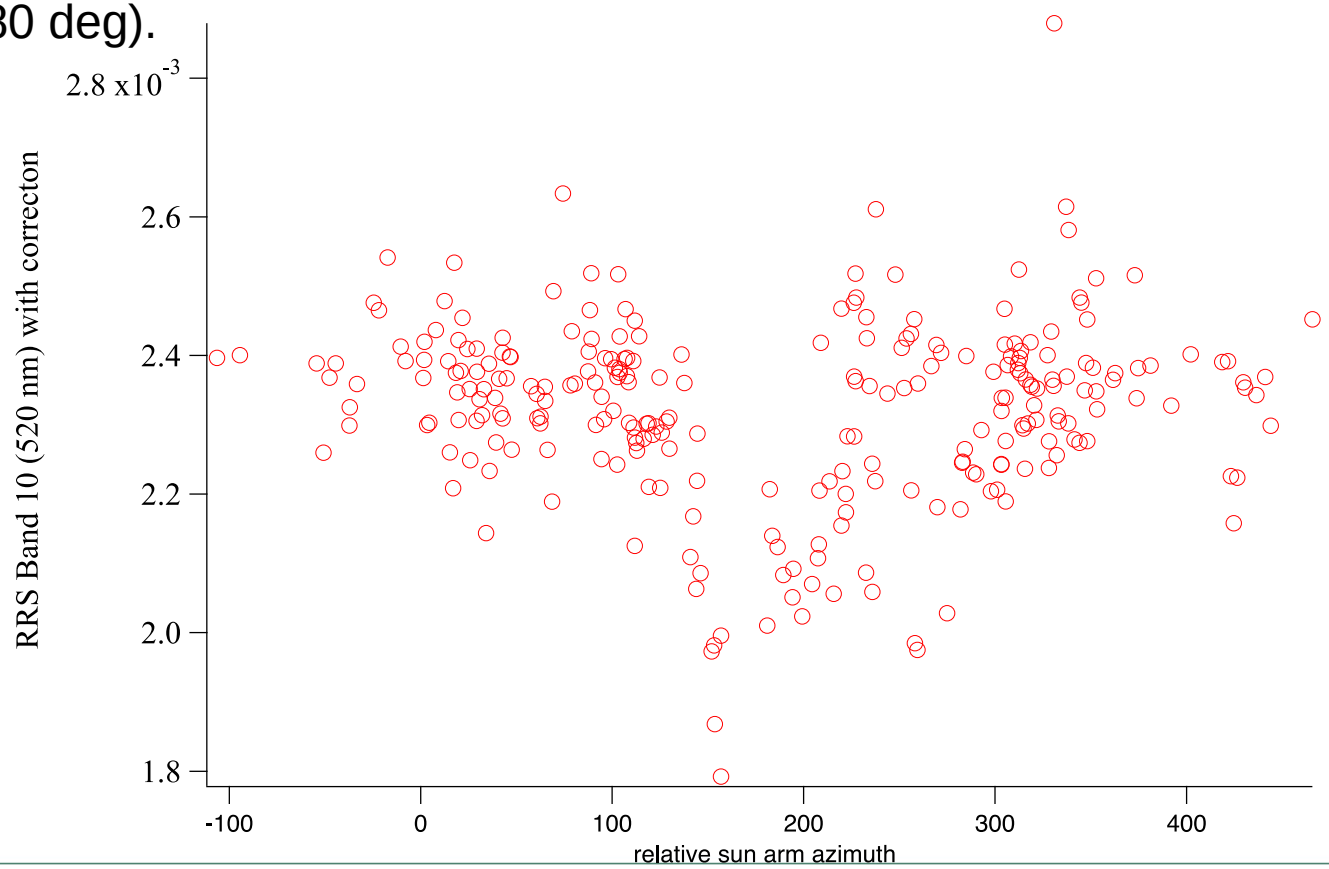


Other corrections include accounting for solar zenith angle, BRDF effects, and small arm depth corrections. These are typically less than 1% effects. So the data with and without these corrections looks like:



In this, the mean is slightly lower (<2% change) and COV is slightly better (5.4% vs. 6/2%).

So far this is without a shadowing correction. The graph below shows the corrected RRS vs. relative sun-arm azimuth. 180 degrees is when the arm and buoy are lined up such that the sun is on the opposite side of the buoy from the arm, maximum shading. As can be seen the lowest points are occurring when the buoy is oriented in this manner, hence these lowest points, while not many in number, need the shadowing correction which we are still working on (about 10% effect at 180 deg).



Time series is on-going, now 20 years long.

New deployment has just started, with 3rd deployment of blue spectrograph

M261 post calibrated data has been posted to the Coastwatch site

We are working on various modeling efforts which could help with both improving the data set and documenting the measurement uncertainty