Abstract:
The VIIRS Orbital overlap was used to examine the stability of the VIIRS ocean color products over a 10-month period. Using product stability was evaluated using product differences between overlapping orbits of the ocean normalized water leaving radiance (nLw) products within ~ 100 minutes. We assume that the difference in nLw products within 100 minutes overlaps should be minimal. By monitoring the short term difference on ocean color, we can define the consistency and seasonal trend of the sensor and products. Additionally, the stability of nLw color products was evaluated for different water types including coastal, shelf, and open ocean waters. The differences in the overlap products, provides an overall assessment of the entire sensor and processing used to produce the products, which include the sensitivity to sensor calibration, algorithms using the solar and spacecraft angles, left and right side of nadir, atmospheric correction, BRDF, and ocean color algorithms. By examining how ocean products difference change each month for different water types, we can more accurately track the sensor and processing trends. The results indicate the 410 channels show the greatest differences, (earlier orbit is greater than second) in winter months and reverses in the summer months. This is more prevalent in the open ocean than in the coastal waters and can possibly be linked to the solar elevation and azimuth angle. The VIIRS orbital overlap product difference provides a highly sensitive capability to assess the products stability and track the sensor and processing trends required for ocean color sensor calibration.

Objective:
- Define short 100 minute orbital changes in VIIRS Orbital Color products
- Examine the monthly differences in the overlap color products.

Questions to Answer:
- What is the spectral difference in the M bands in the overlap?
- Do different water masses (types) show differences in the overlap?
- Should we assume the ocean color response is not changing within the 100 minutes?
- Should we expect coastal waters to have more variability and difference than open waters?
- How do the differences in overlap change through the seasonal months?

Data Set of Orbital Overlaps

The example of open water site shows the spectral mean and variance for each orbit. We assume the average regions are not changing in color within the 100 minutes between orbits. Assume no advection or biological production.

Differences in orbital overlaps for each month:
- For three different water types for all channels

Trends in the Overlap Difference

Open and coastal waters show the greatest differences between the first and second orbit. The nLw differences show the first orbit is typical higher than the second, especially in the winter months. The influence of water advection and biological changes with the 100 minutes is not addressed here.

Summary:
1. VIIRS orbital overlap provides a new capability to track trends in VIIRS ocean products!!
   - Orbit "nLw" differences provide very sensitive ability to track the trends in both sensor response calibration and processing techniques.
   - The color products in regions were assumed to be constant within 100 minutes.
   - This is dependent on diurnal changes? See other Poster.
2. VIIRS products "nLw" showed consistency in the overlap differences even in different water types!
3. Trend observed in nLw differences in the winter and summer months.
4. Winter months had the highest in the open water compared to the second.
5. Could result from the solar elevation being higher in the second orbit in the summer!
6. This depends on diurnal changes! See other Poster!