Geostationary applications relevant to ecosystems & fisheries

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Let’s take a step back in time…

to 2006

The Coastal Ocean Applications and Science Team (COAST) was trying to get the HES-CW (Hyperspectral Environmental Suite with Coastal Waters Imaging capability) flown on NOAA’s GOES-R, a future geostationary satellite (launch date of March 2016).

(We failed.)
Why we need high frequency sampling for coastal ocean dynamics

- Tides, diel winds, river runoff, upwelling and storm winds drive coastal currents that can reach several knots.
- Daily sampling at the same time (e.g. MODIS and in the future VIIRS) cannot resolve tides, diurnal winds, etc.
- Frequent sampling to resolve tides will provide the management and science community with a unique capability to observe the dynamic coastal ocean environment.
- Higher spatial resolution (300 m vs. 1000 m)
- Additional channels to measure solar stimulated fluorescence, suspended sediments, Colored Dissolved Organic Matter (CDOM) and HABs.

These improvements are critical for coastal waters.

Example tidal cycle from Charleston, OR. Black arrows VIIRS sampling, red arrows hourly sampling.

From a 2006 presentation by Curt Davis on the HES-CW
Geostationary SST

April 30, 2015

Data courtesy of ERDDAP, http://coastwatch.pfeg.noaa.gov/erddap
A more realistic example:

A lot of clouds!

April 5, 2015

Data courtesy of ERDDAP, http://coastwatch.pfeg.noaa.gov/erddap
Data courtesy of ERDDAP, http://coastwatch.pfeg.noaa.gov/erddap
May 26, 2015

GEO SST

Polar-orbiting Chl

Data courtesy of ERDDAP, http://coastwatch.pfeg.noaa.gov/erddap
Monterey, CA

Cloud-free days: 13/56 = 23%

Solar Energy Generated, kWh/day
Take-home points

• Biggest advantage of geostationary ocean color data will be improved spatial coverage, not improved temporal resolution.

• High-temporal resolution, i.e. to define tidal cycles, will only be possible in cloud-free regions.

• Blending of data from multiple sensors (i.e. IR and microwave) and platforms (i.e. polar and geo) has been successfully done for SST data via the GHRSSST project. Blending of OC data is considerably more challenging, but has been done by ESA’s GlobColour project (http://www.globcolour.info).
Where were the Fish?

“Ocean Color & Fisheries” keynote talk, Thursday 8:00 am (not 8:30!)