

Dynamic Ocean Products from Geostationary Orbit with Himawari-8

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ABSTRACT:

Himawari-8 went into geostationary orbit for the Japanese Meteorological Agency in October of 2014. Himawari's optical bands (below), though spectrally coarse, provide **~1 km spatial resolution of the Eastern Hemisphere every 10 minutes**, and looks at the Japan Sea (Korea's 'East Sea') every 2.5 minutes. The Signal-to-Noise performance of the optical bands is ~500:1, which suggests it is possible to estimate simple ocean color properties, particularly for bright coastal waters. Here we demonstrated that possibility by showing movies of ocean color products – remote sensing reflectance – along the coast of South Korea during 2015-2016 in support of the NASA GEO-CAPE KORUS-OC campaign. The movies show the basic time scales of ocean color dynamics driven by tidal forcing along the South Korean West Coast, and wind driven coastal upwelling along the South Korean East Coast. Further, the upwelling shows -- in real time -- how nutrient rich waters flow into the biologically productive East Sea.

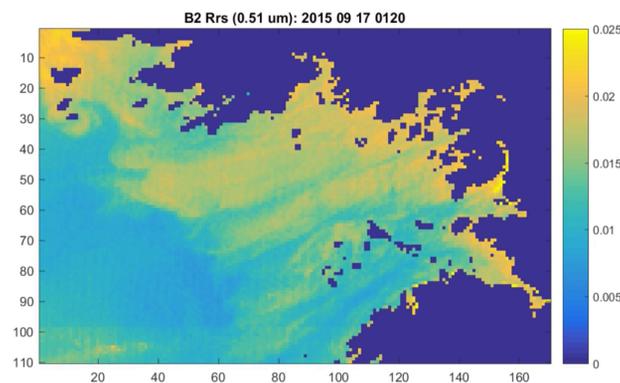
PROCESSING METHODS:

Near real time Himawari data is obtained through the SSEC Data Center at the University of Wisconsin-Madison using the McIDAS package. L1b data is subsetted for regions of interest along the Korean Coast, and atmospherically corrected L2 data is generated using the program 'TAFKAA' (originally based on the ATREM atmospheric simulation program) from the US Naval Research Labs. Remote sensing reflectance (Rrs) is produced for Bands 1-3, and used to create pseudo-RGB images which are histogram-equalized based on an entire day's sequence (~ 70 images). Night sequences are clipped, and image sequences are compiled into mp4 movies covering daily, weekly, or monthly time frames.

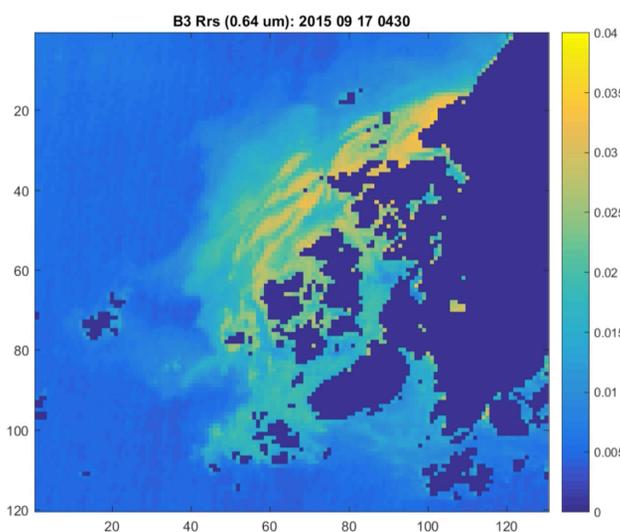
REGIONS AND FEATURES OF INTEREST:



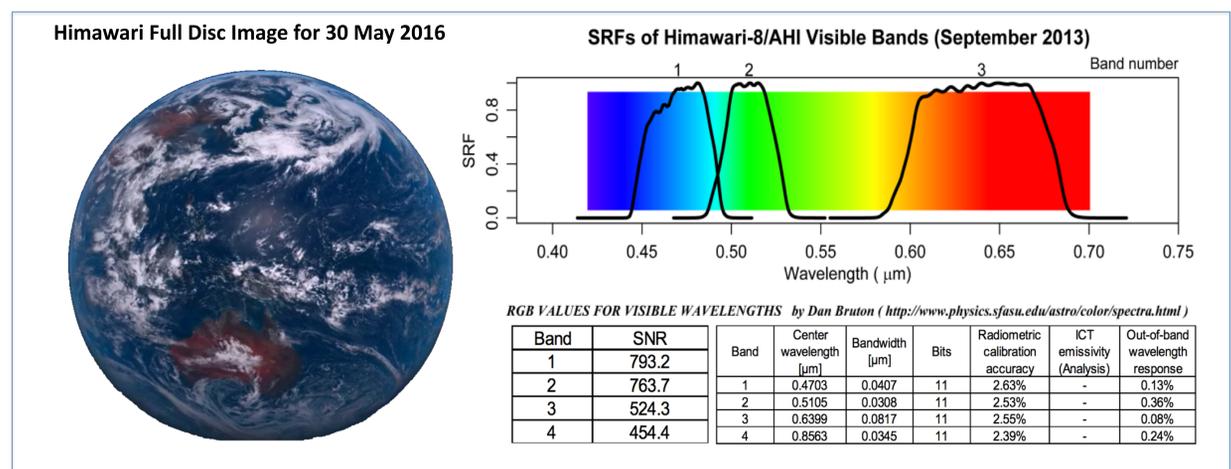
Han river mud flats changes in bottom reflectance due to tides



Tidally driven sediment laden waters off of Jindo



Break up of surface ice near the Port of Dandong



MOVIE PRODUCTS:

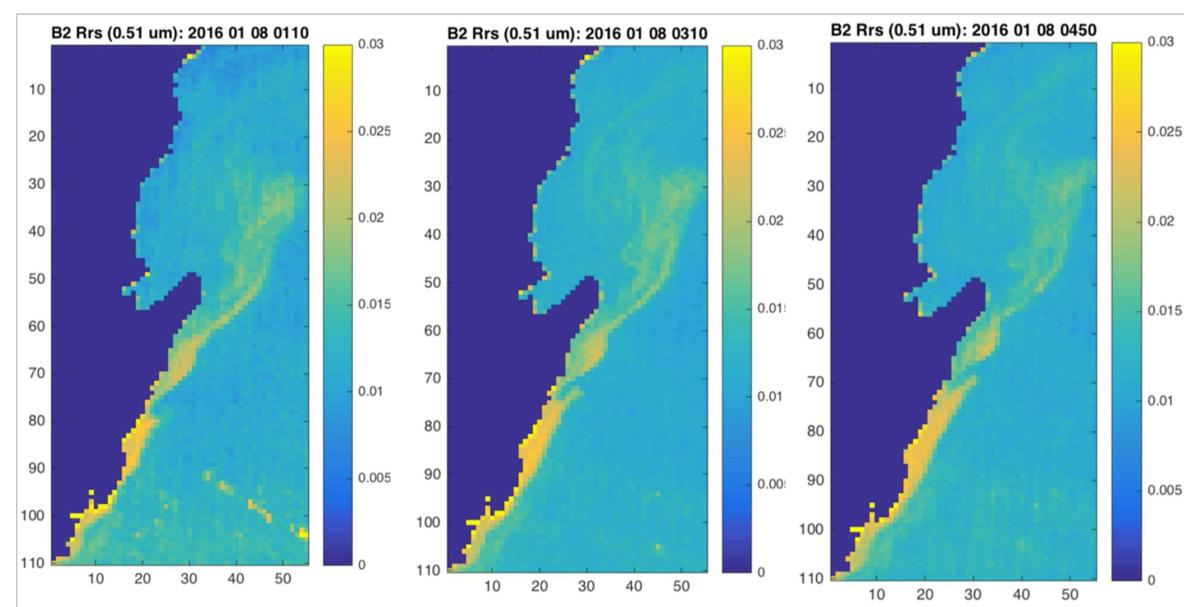
Ocean color Himawari-8 movies are available at:

<http://meris.coas.oregonstate.edu/tmp/kr>

In particular, see the following folders:

- han -- movements of coastal mud flats emanating from the **Han River**
- jindo -- tidally driven sediment laden waters near **Jindo**, West Coast
- joe -- movements of winter surface ice near the Port of **Dandong**
- pohang -- wind driven upwelling near **Pohang**, along the East Coast

A sequence of images showing upwelling near Pohang along the East Coast Warm Current



CONCLUSION:

Himawari-8 can be used to view the finest temporal scale look at coastal ocean dynamics to date, revealing the motion of sediments and pigments in coastal waters at sub-tidal time scales. In particular, the near surface dynamics of coastal upwelling are being studied along the East Coast of South Korea as it drives nutrient rich waters along the East Korean Warm Current and into the biologically rich eddies of the East Sea of Korea.

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