

INCORPORATION of VIIRS SSTs into NOAA/NESDIS 5km Global SST ANALYSES

Eileen Maturi¹, Andy Harris², John Sapper³, Alexander Ignatov¹, Mark Eakin¹, Riley Conrad⁴, Prasanjit Dash⁵

1: NOAA/NESDIS/STAR, College Park, MD, 3: NOAA/NESDIS/OSPO, 2: Univ of Maryland, College Park, MD, 4: SGT College Park, MD, 5: CIRA, Univ of Colorado

BACKGROUND

NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) generates an operational global, high resolution SST analyses (day/night and night-only) in GHRSSST L4 format (Fig 1). This is produced daily from 24 hours of polar and geostationary Level-2P (L2P) sea surface temperature (SST) products in GHRSSST format. The polar SSTs are Metop-B and SNPP. The geostationary SSTs are Geostationary (GOES) East (E) and West (W) Multi-function Transport Satellite (MTSAT) and Meteosat Second Generation (MSG) using a physical retrieval algorithm based on a Modified Total Least Squares algorithm (Koner et al. 2014). These analyses does not use buoy data. It is a multi-scale Optimal Interpolation and uses 3 stationary priors (short, intermediate and long correlation lengths). It mimics non-stationary prior while preserving rigor. The interpolation of the resultant analyses is based on data density. Thus, allowing fine resolution without introducing noise.

The operational VIIRS-SST Frac data (0.75KM) resolution was incorporated into the operational GLOBAL 5KM SST Analyses (day/night and night-only). The VIIRS SST data replaces the NOAA-19 SST data in these analyses (Fig 2).

The VIIRS-SST data within a 1/20 degree area are collected. There can be up to 80 data points of VIIRS-SST data within a 1/20 degree area. These VIIRS-SST data points are then super ob'd to a single SST value 1/20 degree with associated errors. This value is used as an input to generate the analyses (both day/night and night-only). Figure 3 is an image of the super-Ob'd VIIRS-SST data. Figure 4 is an image of the 5km SST analysis with the VIIRS SST successfully incorporated.

These temperature products are used by NOAA Coral Reef Watch to generate products for Bleaching and Alerts for coastal managers (Fig 5); the management of mammals and fisheries by the National Marine Fisheries offices; and the Oceanic Heat Content products for the national weather service for Hurricane and Typhoon intensity for the Atlantic and Pacific Basins (Fig 6, 7, 8).

CORAL REEF MONITORING

5-km – Resolution, Global Coral Thermal Stress Products

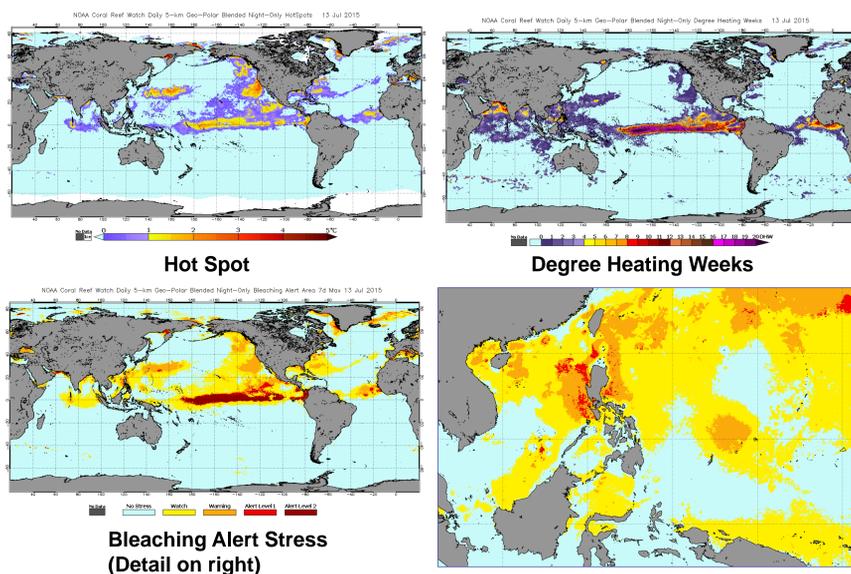


Figure 5 : Based on 5-km Blended SST Analysis

BLENDED SST ANALYSIS

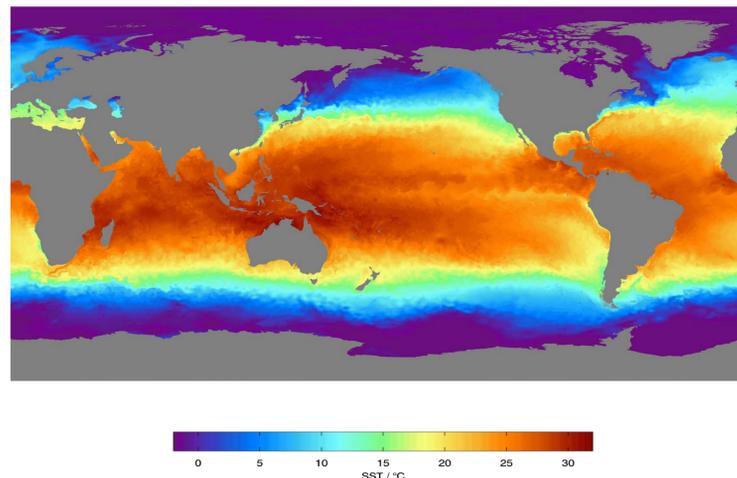


Figure 1: The 5-km blended SST analysis (day/night) are produced daily from 24 hours of polar and geostationary sea surface temperature satellite retrievals (SNPP, Metop-B, GOES E/W, MTSAT-2 and Metosat-10). MTSAT-2 will be replaced by Himawari-8 in November 2015.

OCEANIC HEAT CONTENT

The 5-km Blended SST Analysis is key component of the Oceanic Heat Content Product. Other inputs include altimetry Sea Surface Height and climatological data

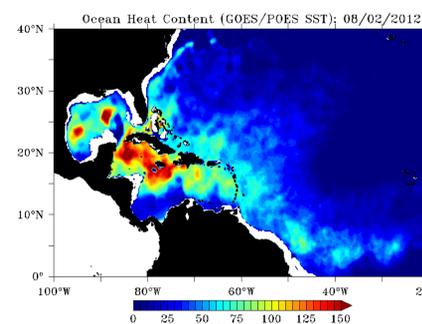


Figure 6: North Atlantic

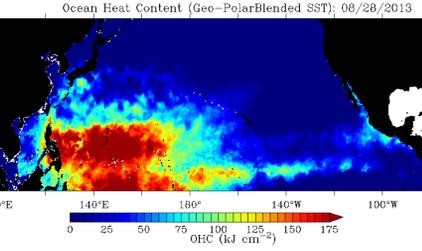


Figure 7: North Pacific

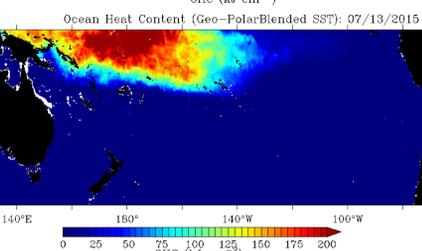


Figure 8: South Pacific

VIIRS SST FRAC 0.75KM DATA

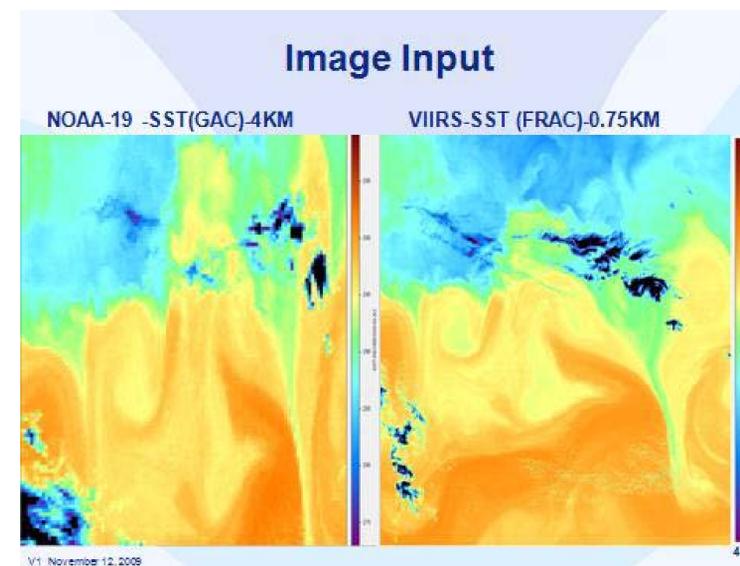


Figure 2 A comparison of NOAA-19 SST GAC 4km data with VIIRS SST FRAC 0.75km data

VIIRS-SST INCORPORATED

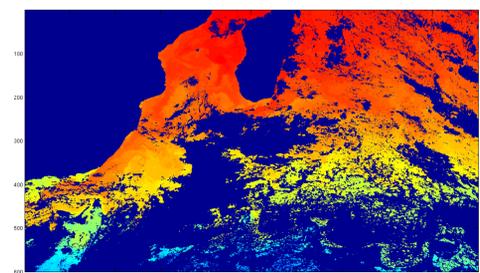


Figure 3: VIIRS-SST super Ob'd to a single SST value 1/20 degree with associated errors.. The value is used as input to the 5KM SST analysis.

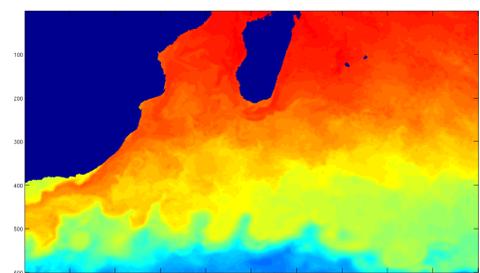


Figure 4: 5KM SST Analysis with the VIIRS Successfully Incorporated