

NOAA's New High-Resolution Sea Surface Temperature Blended Analysis

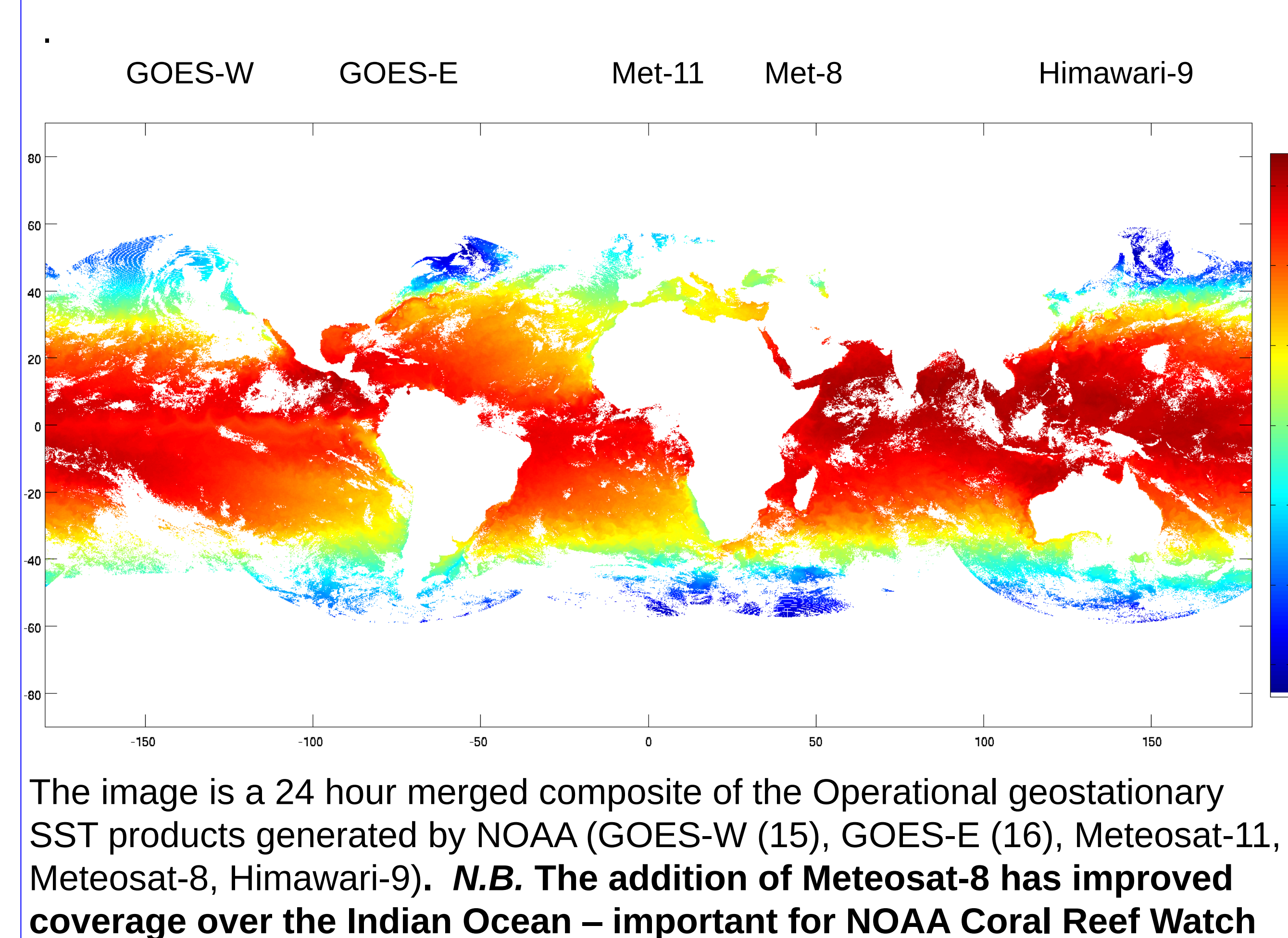
Eileen Maturi¹, Andy Harris², Jonathan Mittaz³, Gary Wick⁴, John Sapper¹

1: NOAA/NESDIS, College Park, MD, 2: Univ of Maryland, College Park, MD, 3: Univ of Reading, UK, 4: NOAA/OAR/ESRL

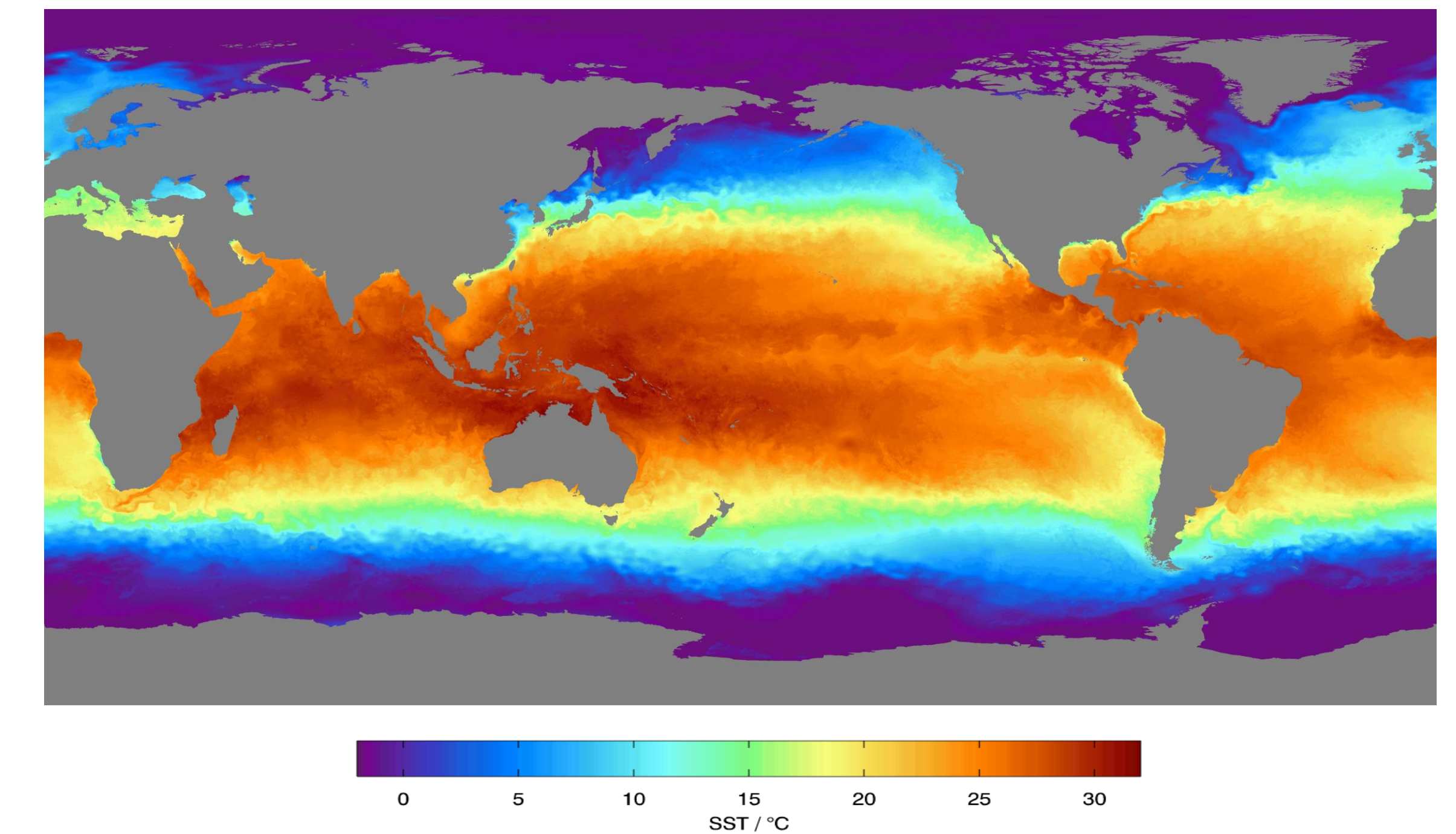
BACKGROUND

NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) generates operational geostationary Level-2P (L2P) Sea Surface Temperature (SST) products in GHRSSST GDS 2.0 format GOES-16 East and GOES-15 West, Meteosat Second Generation (MSG) 11 and 8, and Himawari-8). SST product accuracy for the heritage geostationary sensors was improved with the implementation of a physical retrieval algorithm based on a Modified Total Least Squares algorithm (Koner *et al.*, 2015). Additionally, the operational geostationary SST products are then blended with the polar operational SSTs to produce daily global, 5-km resolution SST analyses in GHRSSST L4 format (Maturi *et al.*, 2017).

GEOSTATIONARY SST COVERAGE



BLENDED SST ANALYSIS

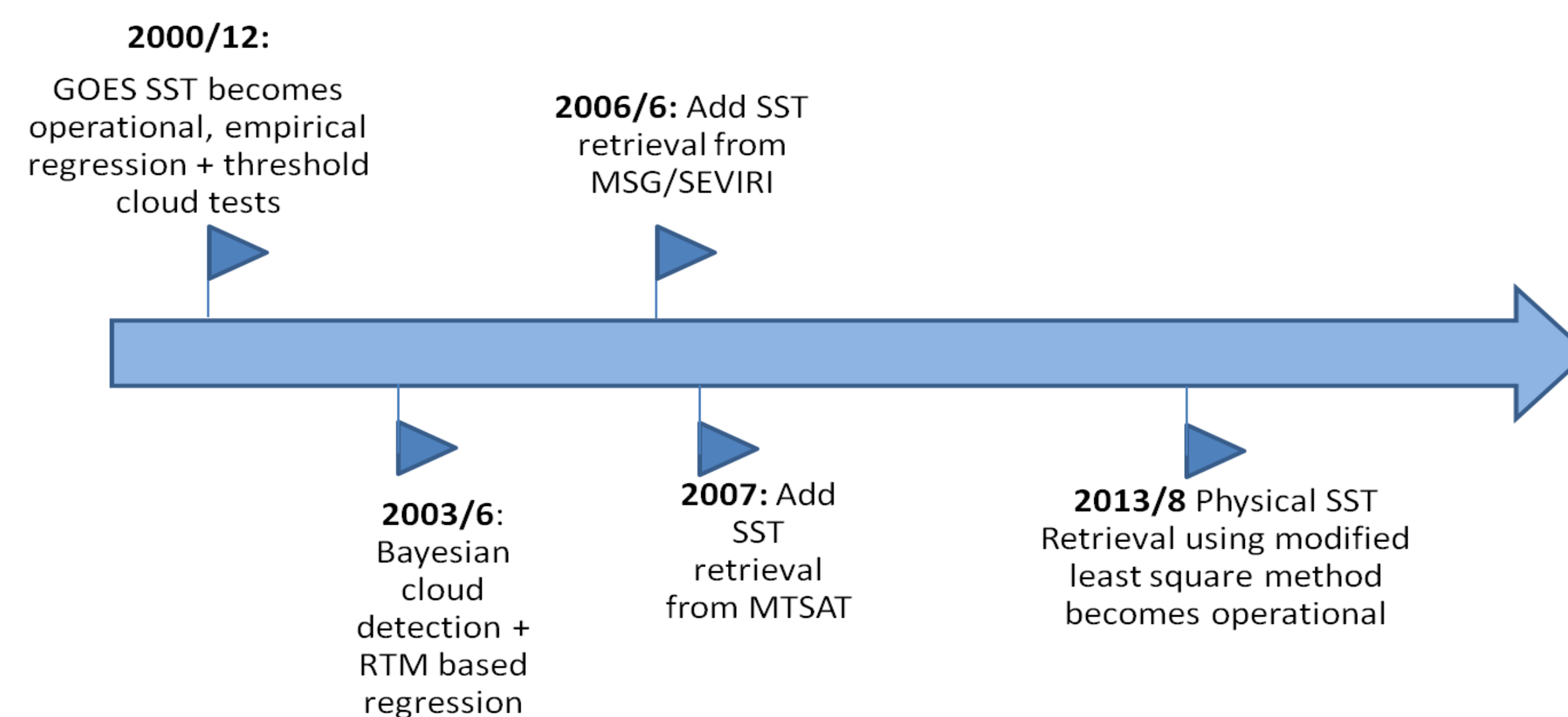


These 5-km blended SST analyses are produced daily from 24 hours of polar and geostationary sea surface temperature satellite retrievals (NPP, Metop-B, GOES-E/W, Himawari-9, and Meteosat-11). Meteosat-8 is being added over the Indian Ocean.

- Day & Night
- Night-only
- Diurnally adjusted Day & Night

OPERATIONAL SST RETRIEVAL

History of GEO SST retrieval algorithms at NOAA/NESDIS

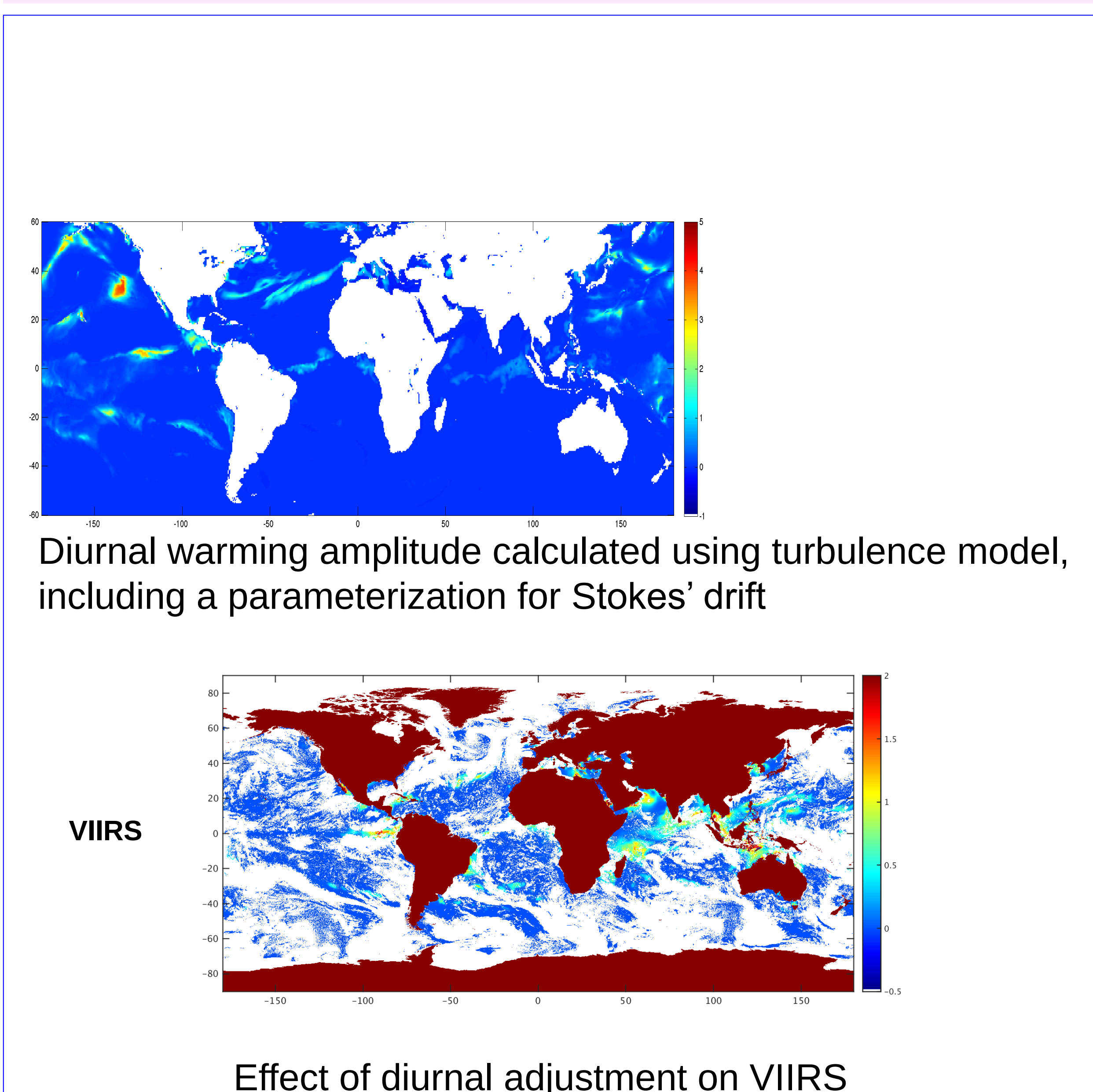


Current geostationary SST retrieval: MTLS physical retrieval + Bayesian cloud detection for clear sky (Koner *et al.*, 2015, Merchant *et al.*, 2005)

Geo-Polar Blending: A multi-scale OI with data-adaptive correlation length scale, giving a ~5-km global L4 product (Maturi *et al.*, 2017)

- Analysis is performed at 3 different scales
- Final result is interpolated from these analyses based on data density
- Preserves fine-scale features without introducing excessive noise

EFFECT OF DIURNAL ADJUSTMENT



SUMMARY

The analysis product validates to 0.3 K RMS against independent ARGO data (see https://www.star.nesdis.noaa.gov/sod/sst/squam/analysis/l4/?l4sst=CMC&ref=IQ2_AG&aggtime2=monthly&s tats=SD#timeseries_dyn). The physically retrieved SST L2P inputs from the heritage geostationary imagers are an important component of the SST Analysis products. The temporal and increased data coverage of the geostationary satellites generated by a high quality SST with Standard Deviation of 0.3-.5 makes this a uniquely powerful product for many ocean applications requiring mesoscale temperature information.

Maturi E, A Harris, J Mittaz, J Sapper, G Wick, X Zhu, P Dash, P Koner, A New High Resolution Sea Surface Temperature Blended Analysis, *Bull. Am. Meteorol. Soc.*, **98**, 1015-1026, 2017