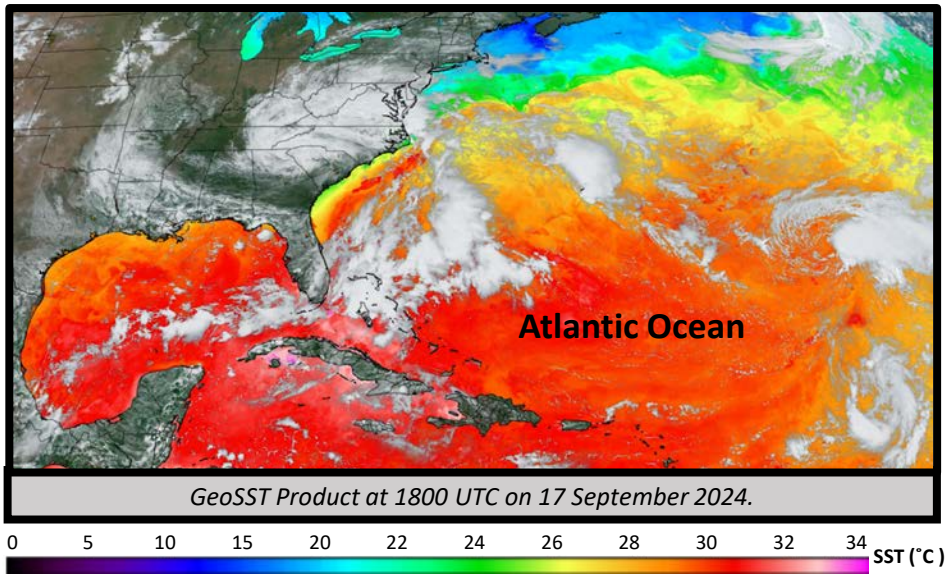
GeoSST Product Quick Guide

Why is the GeoSST Product Important?

GeoSST imagery combines a retrieval of sea surface temperatures (SST) with GeoColor to combine the best qualities of both products into a single imagery product. GeoSST aids forecasting of tropical cyclones, mid-latitude marine extratropical cyclones and extratropical transition of cyclones. GeoSST blends SST information with GeoColor to provide information on both the SST and the cyclones themselves.



GeoSST Product at 1800 UTC on 17 September 2024.

How is the GeoSST Product Created?

GeoSST utilizes the NOAA Advanced Clear Sky Processor for Oceans (ACSPO) SST (also referred to as the GOES Enterprise SST) product. The product is a satellite-based retrieval of SST based on GOES-R ABI observations, available at 5 km resolution with a cadence corresponding to the GeoColor scan frequency (Mesoscale, CONUS, Full Disk), however the SST product is updated hourly. Retrievals of SST are very sensitive to cloud cover, and retrievals are not performed anywhere any amount of cloud cover is detected. To fill in these gaps and provide a full picture of SST, the GeoSST algorithm maintains a compilation of the most recent valid SST retrievals dating back indefinitely. This may introduce errors where persistent cloudiness prevents accurate retrieval of SST. However, clouds will be visible in the GeoSST product and will obscure most of these out-of-date SST retrievals. To avoid atmospheric effects near the limb, SST retrievals are not performed at satellite zenith angles greater than 80˚. During the daytime, SST information is blended with GeoColor based on the 0.64 µm band reflectance. During the nighttime, the SST information is used as the background surface layer where valid SST retrievals are present. The blue low cloud and grayscale high cloud masks used by GeoColor are plotted on top of the SST layer similar to how they appear over land. Over land and near the limb, GeoSST defaults to the original GeoColor algorithm at night.

Impact on Operations

Combined SST and Cloud Product: SST and cloud information from GeoColor is combined into one imagery product.

Marine Cyclone Intensity Forecasting: GeoSST provides SST information in the environment surrounding (and ahead of) marine cyclones.

Lake-Effect / Enhanced Precipitation: As this retrieval provides surface temperature information over large lakes (e.g. the Great Lakes) as well, GeoSST may provide useful information for forecasting lake-effect or lake-enhanced precipitation. Be aware that if cloud cover is persistent, the SST information may be relatively old (e.g. overestimate SST when quickly transitioning from Fall to Winter).

Limitations

Cloud Cover: SST retrievals are not performed where any amount of cloud cover is present.

Thin Cirrus, Thin Smoke and Blowing Dust Over Water Surfaces May Not Be Visible During Daytime: Since SST information is blended with GeoColor based on the 0.64 µm band reflectance, thin cirrus, thin smoke, blowing dust and other poorly reflective clouds may not be visible over water surfaces during the day.

Ice Cover: SST retrievals are not performed where ice is present.

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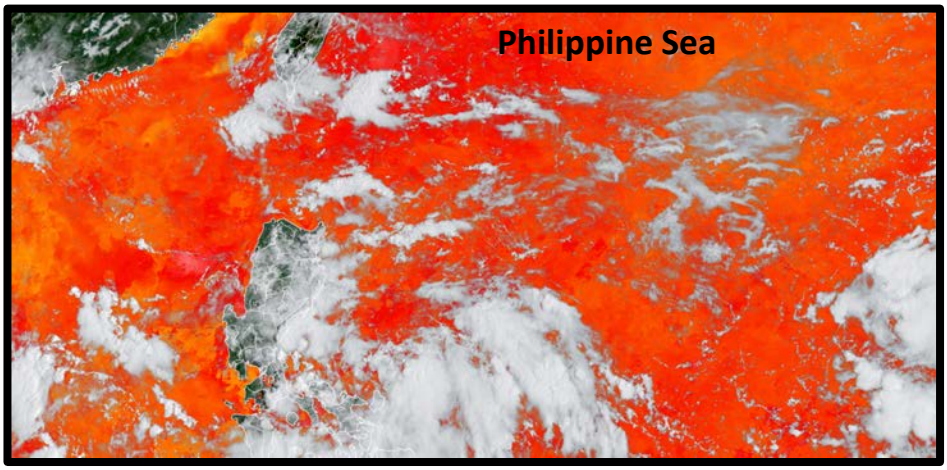
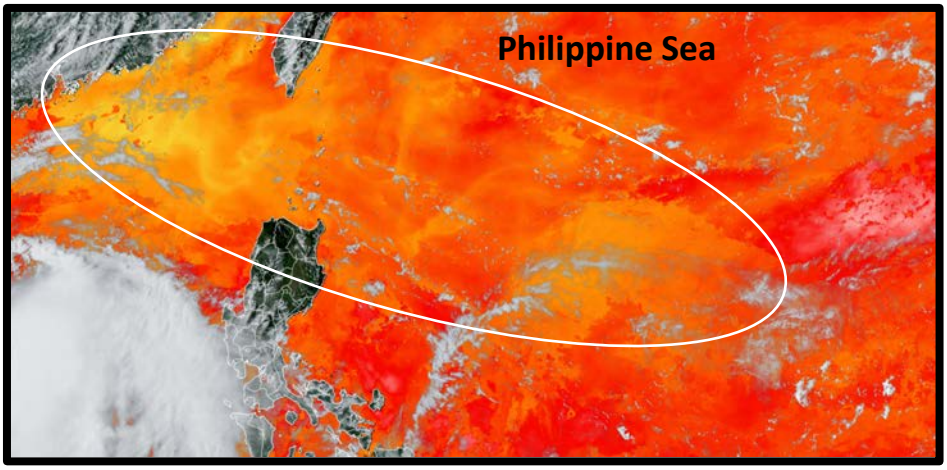


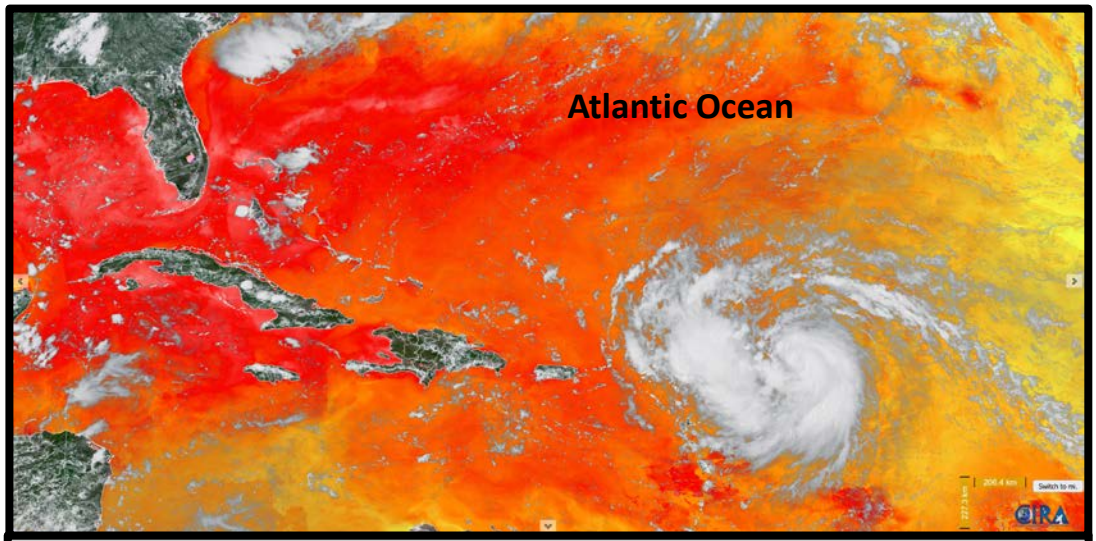


Top: *CIRA GeoSST Product at 0020 UTC on 16 September 2025 (daytime).*

Bottom: *CIRA GeoSST Product at 0830 UTC on 27 September 2025 (daytime).*

The white oval depicts the cold wake left behind by Typhoon Ragasa which occurred in the area between September 18-25, 2025.

The GeoSST Product uses a bi-linear colorbar, with a different scale for 0-20 ˚C and 20-34 ˚C. The transition from green to yellow occurs at 26 ˚C, the threshold for tropical cyclogenesis.



CIRA GeoSST Product at 1800 UTC on 15 August 2025 (daytime), showing Hurricane Erin prior to rapid intensification.

Resources:

GeoSST on CIRA SLIDER

SBC Webinar