

Operational Ocean Heat Content Variability at NESDIS from Satellite Radar Altimetry Measurements for Intensity Forecasting

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A 19-year time series of oceanic heat content (OHC) estimates relative to 26°C water has been generated from quality controlled sea surface height anomaly (SSHA) fields from various satellite radar altimetry missions (e.g., Jason 1, 2, Envisat, SARAL, Cryosat-2). These data are cast into a reduced-gravity ocean model and a daily ocean climatology of mean isotherm depths and reduced gravities. Over this time/space series, two or more satellites have been operational at any given time to resolve mesoscale ocean variability in three basins. Objectively mapped SSHA field is used to produce isotherm depths of the 20° and 26° (D20, D26), mixed layer depth (MLD) and geostrophically balanced surface currents. Daily isotherm and mixed layer depths are combined with sea surface temperatures (SST) from Remote Sensing System's Optimally Interpolated SST and NESDIS Geo-Polar SST Analysis to estimate spatially varying OHC for use in tropical cyclone intensity forecasting models (e.g., SHIPS) as well as assess oceanic conditions from coupled operational forecast models.

For the operational product suite, SSHA data from 10 days before the date in question are used. By contrast, reprocessed data uses SSHA data from 5 days before and 5 days after the date of interest for more of a detailed research product including those with longer repeat tracks so mesoscale oceanic features were not unnaturally stretched out. As part of the product generation and updating the climatologies, satellite-derived estimates have been compared to over a million *in-situ* thermal measurements from multiple platforms (e.g., Argo and Apex floats, drifters, ship-based XBT transects, AXBTs, moorings) to assess uncertainties in space-based estimates. These evaluated products date back to 1998 for three basins. The intent over the next several months is to entrain Jason-3 and Sentinel-3 radar altimetry data to enhance the NESDIS product suite, which will improve the resolution of ocean features.