

6B.4 COMPARISON OF THE NCDC SEA SURFACE TEMPERATURE DATASETS: ERSST AND OISST

Chunying Liu*, Richard W. Reynolds*, Tom Smith+, and Patria Viva F. Banzon*

NOAA's National Climatic Data Center, Asheville, North Carolina

1. INTRODUCTION

The purpose of this presentation is to compare two different sea surface temperatures analyses with very different spatial and temporal resolutions: the monthly 2° Extended Reconstruction SST (ERSST) analysis and the daily 1/4° Optimally Interpolated SST (OISST) analysis. The ERSST analysis is based on in situ (ship and buoy) observations from the International Comprehensive Ocean-Atmosphere Data Set (ICOADS). The analysis is produced from 1854 to present (Smith et al. 2004). The OISST uses in situ data and satellite data. One version from September 1981 to present uses Advanced Very High Resolution Radiometer (AVHRR) data and the other beginning in June 2002, adds Advanced Microwave Scanning Radiometer (AMSR) data. The in situ data from ships and buoys are combined with the satellite data using the optimum interpolation method of Reynolds et al. (2007) to produce daily global gridded fields. Both analyses use sea-ice data to help define the SSTs near the sea-ice margin. The OISST includes a large scale bias correction (roughly 10° spatially and 15 days temporally) to correct any satellite biases. However, a small satellite residual remains. To avoid any satellite biases, satellite data were not used in ERSST.

To examine the differences we show three examples on different scales. The first example in Figure 1 shows large-scale monthly anomalies for 1982-2009 for the Northern (0-60°N) and the Southern (60°S-0) Hemisphere.

Same climatology, which base period is 1971-2000 (Xue et al. 2003) was used to produce the OISST and ERSST anomalies. Here the variability of the two analyses is very similar in both hemispheres. However, the OISST is roughly 0.1°C cooler than the ERSST in the Northern Hemisphere. This is because biases in the ship data were corrected with respect to the buoys by subtracting -1.4°C. This correction was not done in ERSST because there were no buoy data prior to the 1970s. In the Southern Hemisphere the OISST is cooler by roughly 0.3°C. This is primarily due to a cold residual bias in the AVHRR satellite data.

A middle-scale average is now shown for the NINO3.4 region (5°S-5°N, 170°W-120°W) in Figure 2. This region shows the strong ENSO signal. Because of the strong ENSO signal, the small biases differences between the two analyses are obscured and the differences are almost indistinguishable. Both analyses do a good job of monitoring ENSO.

A finer-scale analysis is shown for the Gulf of Mexico. The upper panel shows the OISST on 29 August 2009, the day Hurricane Katrina hit New Orleans. In this version of the OISST, AMSR SST data are used because microwave data can penetrate cloud cover. The cold wake form the Hurricane can clearly be seen. In contrast the lower panel shows ERSST for the month of August 2005 shows no impact of the hurricane.

Both analyses have their own purpose. ERSST was designed to show large-scale changes in SSTs from 1854 to present; the

* *Corresponding author address:* Chunying Liu, NOAA's National Climatic Data Center, 151 Patton Avenue, Asheville, North Carolina 28801

+ Tom Smith, NOAA/NESDIS/STAR and CICS, College Park, Maryland

OISST was designed to show small-scale SST features. Users need to choose the correct analysis based on their own climate and weather requirements.

REFERENCES:

Smith, T.M., and R.W. Reynolds, 2004: Improved Extended Reconstruction of SST (1854-1997). *Journal of Climate*, **17**, 2466-2477.

Reynolds, R. W., T. M. Smith, C. Liu, D. B. Chelton, K. S. Casey and M. G. Schlax, 2007: Daily High-resolution Blended Analyses for sea surface temperature. *J. Climate*, **20**, 5473-5496.

Xue, Y., T. M. Smith, and R. W. Reynolds, 2003: Interdecadal changes of 30-yr SST Normals During 1871-2000. *J. Climate*, **16**, 1601-1612.

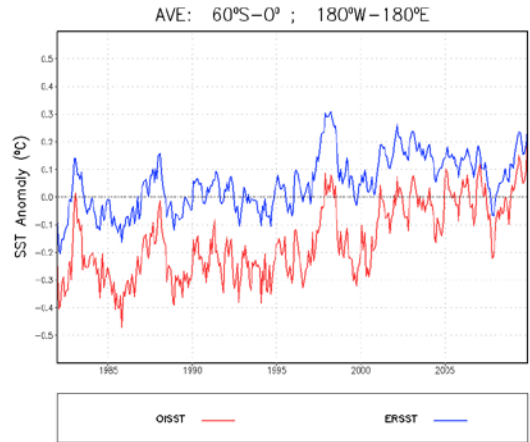


Figure 1: Monthly OISST and ERSST anomalies time series for 1982-2009. The upper panel shows the region 0-60°N; the lower panel shows the region 60°S-0.

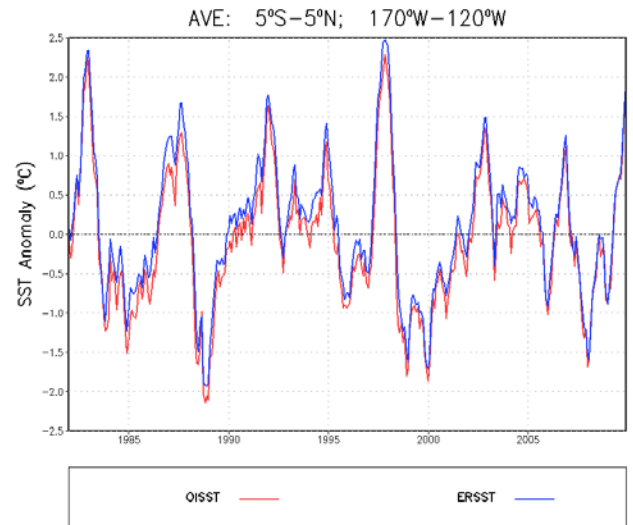
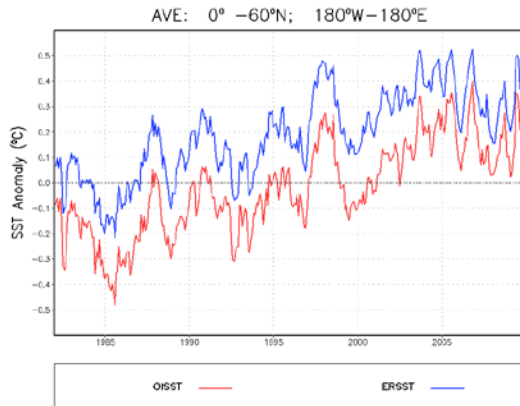
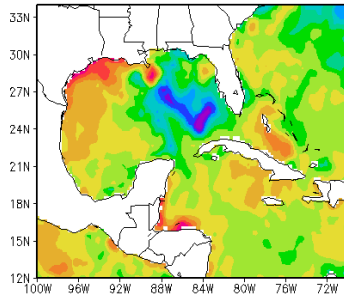


Figure 2: Monthly OISST and ERSST anomalies of NINO 3.4 region (5°S-5°N, 170°W-120°W)

Gulf of Mexico
AMSR+AVHRR OISST 29AUG2005



ERSST AUG2005

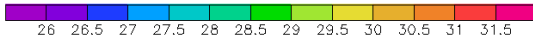
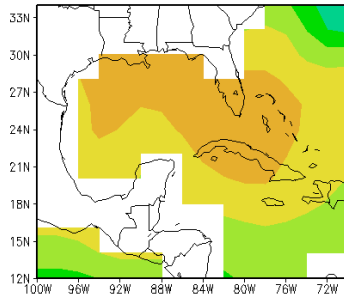


Figure 3: Gulf of Mexico SSTs. Top Panel: OISST for 29 August 2009. Bottom panel: ERSST for August 2009. Note the cold wake from Hurricane Katrina in the upper panel.