EVALUATION OF THE NOAA REAL TIME OCEAN FORECAST SYSTEM_ATLANTIC AT THE NOAA OCEAN PREDICTION CENTER

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OUTLINE

• **Ocean Prediction Center**

• **RT_OFS_ATL vs. Satellite (GOES) SST**
  – West Atlantic: Jan 2006 – Apr 2007, weekly
  – Gulf of Mexico: Oct 2006 – Apr 2007, biweekly

• **Water Levels**
  – Feb – Apr 2007, weekly

• **Comparison w/ Buoys**
  – West Atlantic: Oct 2006 – Apr 2007, daily
  – Gulf of Mexico: Jan 2007 – Apr 2007, daily

• **New Parallel Model**
  – Preliminary Analysis: Last week

• **Future Plans**
April Noreaster
RT_OFS_ATL vs. GOES SST in the West Atlantic

RT_OFS_ATL SST 03/02/2007

GOES SST 03/02/2007
RT_OFS_ATL vs. GOES SST in the West Atlantic

Nowcast

RT_OFS_ATL – GOES SST 03/02/2007

Degrees C

44004

41009
RT_OFS_ATL vs. GOES SST in the West Atlantic

24 Hour Forecast
RT_OFS_ATL vs. GOES SST in the Gulf of Mexico

GOES SST March 15, 2007

RT_OFS_ATL SST March 15, 2007
Gulf of Mexico

NAVOCEANO GULF FEATURES ANALYSIS
March 14, 2007

RT_OF_S_ATL_CURRENTS
March 15, 2007
Gulf of Mexico

RT_OFS_ATL SST March 15, 2007

GOES SST March 15, 2007
WATER LEVELS: NOS STATIONS and RT_OFS_ATL

Lewes, DE

Boston

Hycom vs Observed Demeaned Water Levels at
Lewes, DE
Station 6557380

Hycom vs Observed Demeaned Water Levels at
Boston
Station 6443970

<table>
<thead>
<tr>
<th>Hours Starting on 20070321 at 0:00 UTC</th>
<th>Meters</th>
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<tbody>
<tr>
<td>---------------------------------------</td>
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</tr>
<tr>
<td>RTOFSAI (mean = 1.05 meters)</td>
<td></td>
</tr>
<tr>
<td>OBSERVED (mean = 0.52 meters)</td>
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<tr>
<td>---------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>RTOFSAI (mean = 0.33 meters)</td>
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<tr>
<td>OBSERVED (mean = 1.4 meters)</td>
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</tbody>
</table>
WATER LEVELS: NOS STATIONS and RT_OFS_ATL

Nantucket

Cape May, NJ

Hycom vs Observed Demeaned Water Levels at
Nantucket Station

Hycom vs Observed Demeaned Water Levels at
Cape May, NJ Station

RTOFSATL (mean = -0.96 meters)

OBSERVED (mean = 0.32 meters)

Meters

0 20 40 60 80 100 120

Hours Starting on 07/03/2021 at 0:00 UTC

RTOFSATL (mean = -1.03 meters)

OBSERVED (mean = 0.53 meters)

Meters

0 1 2 3 4 5 6 7 8 9 10 11 12

Hours Starting on 07/03/2021 at 0:00 UTC
NOAA OFFSHORE BUOYS

Atlantic Buoys

41001 East Hatteras
41002 South Hatteras
44004 Hotel
44005 Gulf of Maine
44008 Nantucket
41008 Grays Reef
41009 Canaveral
41010 Canaveral East
Gulf of Mexico Buoys

42001 Mid Gulf
42002 Western Gulf
42003 East Gulf
42019 Freeport
42020 Corpus Christi
42035 Galveston
42039 Pensacola
42040 Mobile South
Atlantic Hourly RMS of RT_OFS_ATL and Buoy SST for January 2007
Gulf of Mexico Hourly RMS of RT_OFS_ATL and Buoy SST for January 2007
Average RMS for Atlantic and Gulf of Mexico Buoys in January 2007

Atlantic Buoys RMS of Model - Buoy SST for January 2007

\[ y = 0.0188x + 2.0832 \]
\[ R^2 = 0.6743 \]

Gulf of Mexico Buoys RMS of Model - Buoy SST for January 2007

\[ y = 0.0431x + 0.8469 \]
\[ R^2 = 0.8923 \]

Small Positive Slopes

Degrees C

+0.02° C / Day

+0.04° C / Day
Average RMS for Atlantic and Gulf of Mexico Buoys in February 2007

Atlantic Buoys RMS of Model - Buoy SST for February 2007

\[ y = 0.0563x + 1.9215 \]
\[ R^2 = 0.9812 \]

Small Positive Slopes

Gulf of Mexico Buoys RMS of Model - Buoy SST for February 2007

\[ y = 0.0547x + 0.8501 \]
\[ R^2 = 0.9703 \]

Average RMS for Atlantic and Gulf of Mexico Buoys in February 2007
Average RMS for all Atlantic and Gulf of Mexico Buoys in March 2007

Atlantic Buoys RMS of Model - Buoy SST for March 2007

\[ y = 0.0397x + 1.907 \]

\[ R^2 = 0.1182 \]

0.00 0.50 1.00 1.50 2.00 2.50

0 Hour 24 Hours 48 Hours 72 Hours 96 Hours 119 Hours

Gulf Buoys RMS of Model - Buoy SST for March 2007

\[ y = 0.1767x + 0.7599 \]

\[ R^2 = 0.3419 \]

0.00 0.50 1.00 1.50 2.00 2.50 3.00

0 Hour 24 Hours 48 Hours 72 Hours 96 Hours 119 Hours

Small Positive Slopes

+0.04° C / Day

+0.18° C / Day
Average of Daily Difference (Bias) between RT_OFS - Buoy SST

NDBC Buoy

Degrees C

E. Hatteras
S. Hatteras
Hotel
Gulf of ME
Nantucket
Grays Reef
Canaveral
Canaveral E.
Mid Gulf
W. Gulf
E. Gulf
Freeport
Corpus Christi
Galveston
Pensacola
Mobile S.
Average of Daily Standard Deviation of
RT_OFS - Buoy SST

Degrees C

NDBC Buoy

E. Hatteras  S. Hatteras  Hotel  Gulf of ME  Nantucket  Grays Reef  Canaveral  Canaveral E.  Mid Gulf  W. Gulf  E. Gulf  Freeport  Corpus Christi  Galveston  Pensacola  Mobile S.
Average of Daily Difference (Bias) between
RT_OFS_ATL - Buoy SST

Degrees C

<table>
<thead>
<tr>
<th></th>
<th>All Buoys</th>
<th>Atlantic Buoys</th>
<th>Atlantic Buoys w/out 44004</th>
<th>Gulf of Mexico Buoys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degrees C</td>
<td>-0.80</td>
<td>-0.60</td>
<td>-0.40</td>
<td>-0.20</td>
</tr>
</tbody>
</table>

-0.80 - 0.00 - 0.20 - 0.40 - 0.60 - 0.80
Average Daily Standard Deviation of
RT_OFS_ATL - Buoy SST

All Buoys

Atlantic Buoys

Gulf of Mexico Buoys
New Parallel RT_OFS_ATL in the West Atlantic

Parallel RT_OFS April 22, 2007

Goes SST April 22, 2007
New Parallel RT_OFS_ATL in the West Atlantic

Parallel RT_OFS – Goes SST April 22, 2007
Parallel RT_OFS – Goes SST April 21, 2007
New Parallel RT_OFS_ATL in the Gulf of Mexico

Parallel RT_OFS April 22, 2007

Goes SST April 22, 2007
New Parallel RT_OFS_ATL in the Gulf of Mexico

Parallel RT_OFS – Goes SST April 22, 2007  Parallel RT_OFS – Goes SST April 20, 2007
Conclusions and Future Plans

• Assimilation Problems in Western Atlantic (Gulf Stream Overshoot and Florida Current) and in Gulf of Mexico (Loop Current)

• RT_OFS_ATL shows only small decrease in Forecast Capability out to Five Days

• Compare RT_OFS_ATL with other SST products including the NOAA NCDC Optimum Interpolation 1/4 Degree Daily SST Analysis (Reynolds & Smith)

• Continue Reviewing New Parallel Run of RT_OFS_ATL

• Continue and expand analysis of Water Levels