THE 1/12° ATLANTIC OCEAN PREDICTION SYSTEM

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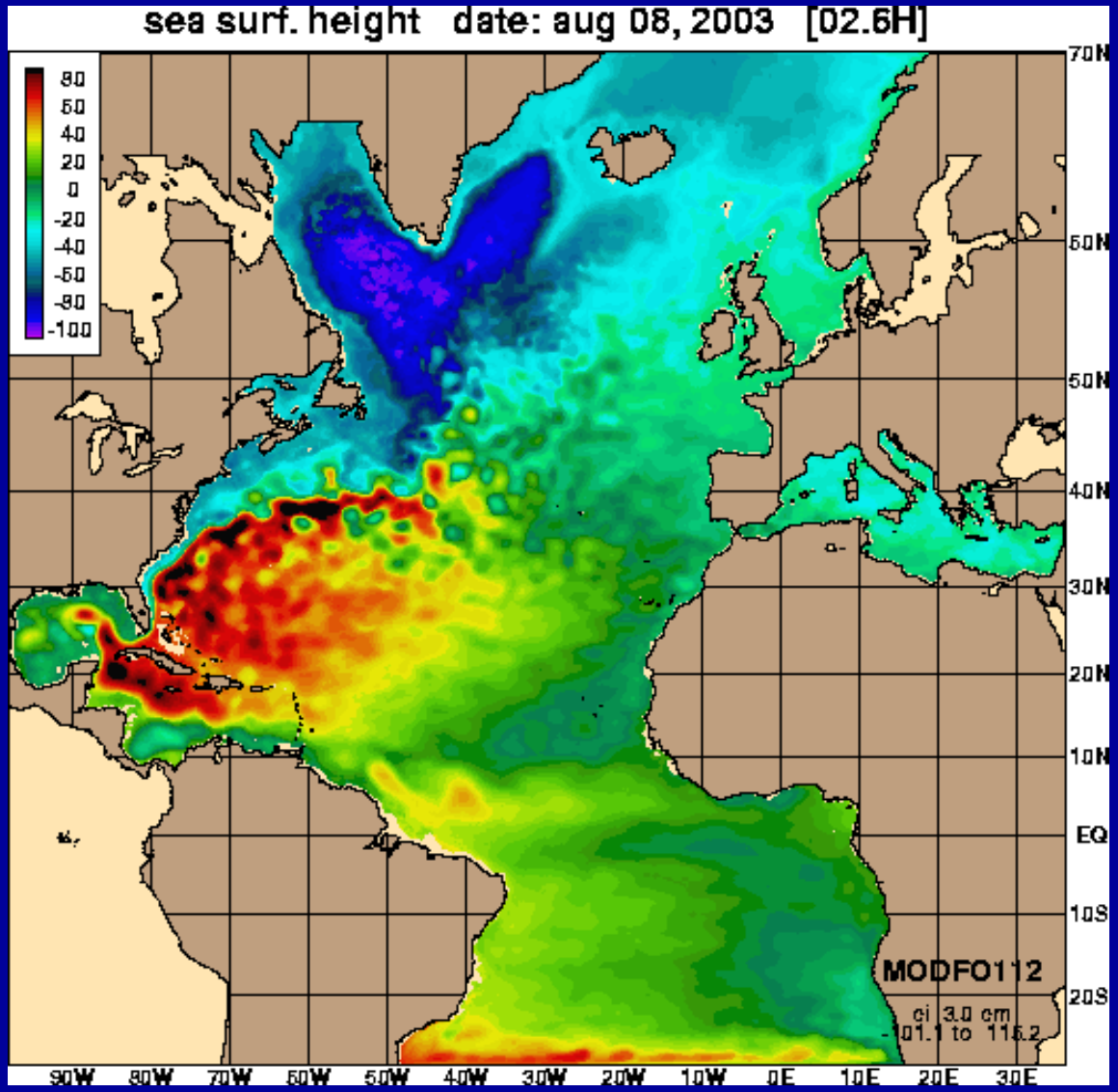
LEGOS / BRESM

1/12° ATLANTIC HYCOM SSH

8 August, 2003



ATLANTIC MODEL CONFIGURATION

- Horizontal grid: 1/12° (1678 x 1609 grid points, 6.5 km spacing on average)
- 28°S to 70°N
- 26 vertical coordinate (σ-theta reference)
- Bathymetry: Quality controlled ETOPO 2.5
- Surface forcing FNMOC

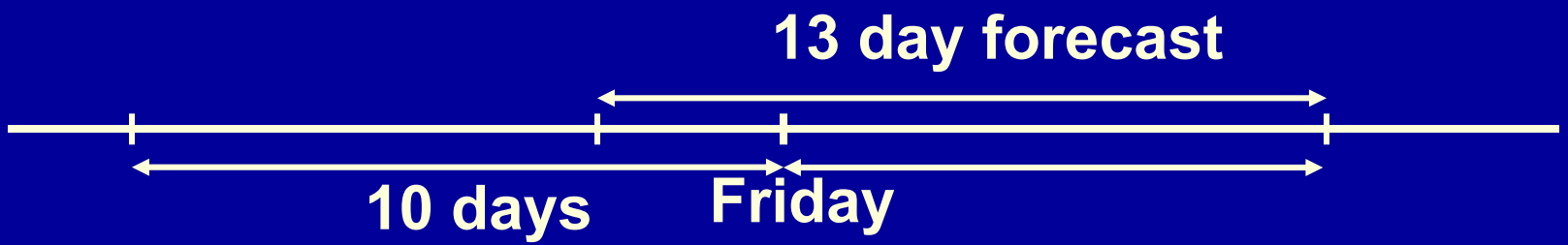
  [wind stress, wind speed, heat flux (using bulk formula), E-P + relaxation to climatological SSS]
- River runoff
- Buffer zones:

  3° north and south with relaxation to monthly climatological T and S (MODAS)

Present system

- **A near real-time nowcast/forecast system with the 1/12° Atlantic model**
  - **. Assimilates the satellite altimeter analysis from the MODAS operational system at NAVOCEANO**
  - **. Mean SSH from the 1/12° MICOM (ECMWF)**
  - **. Vertical projection via the Cooper and Haines technique (1996, JGR)**
  - **. FNMOC atmospheric forcing**
- **Automated scripts to run the system from the preprocessing of the forcing fields to the post processing of the results**
- **Includes the extraction of the fields for MERSEA (more on Thursday)**

Near real-time system



Analysis wind and thermal forcing
Assimilation of MODAS SSH anomaly analysis

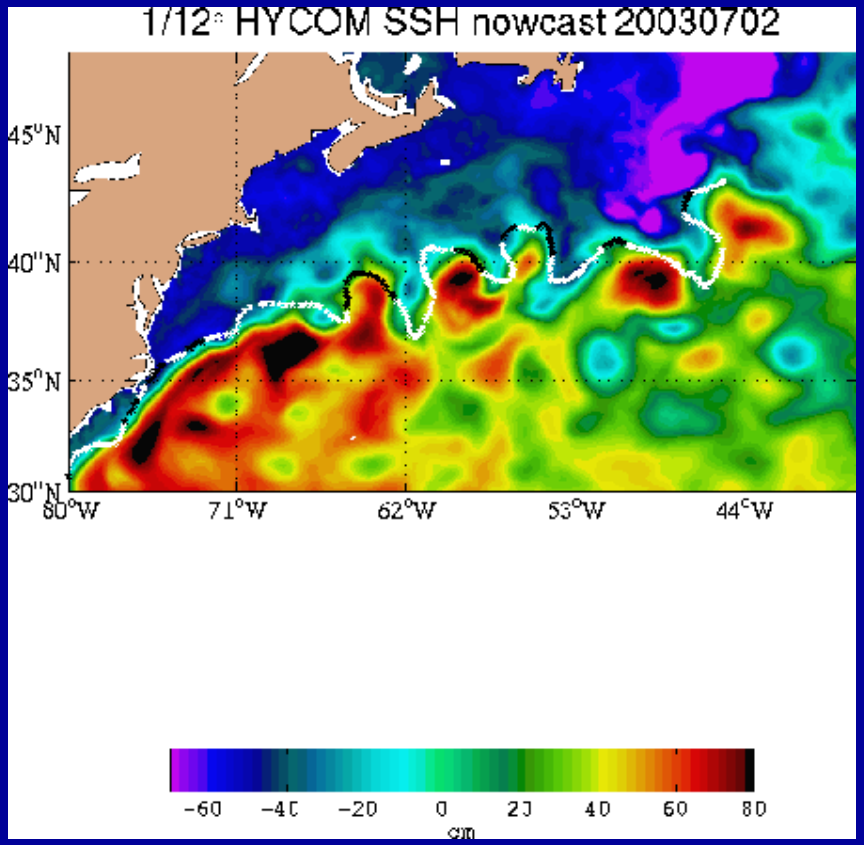
Forecast wind and thermal forcing
Revert toward climatological wind and thermal forcing

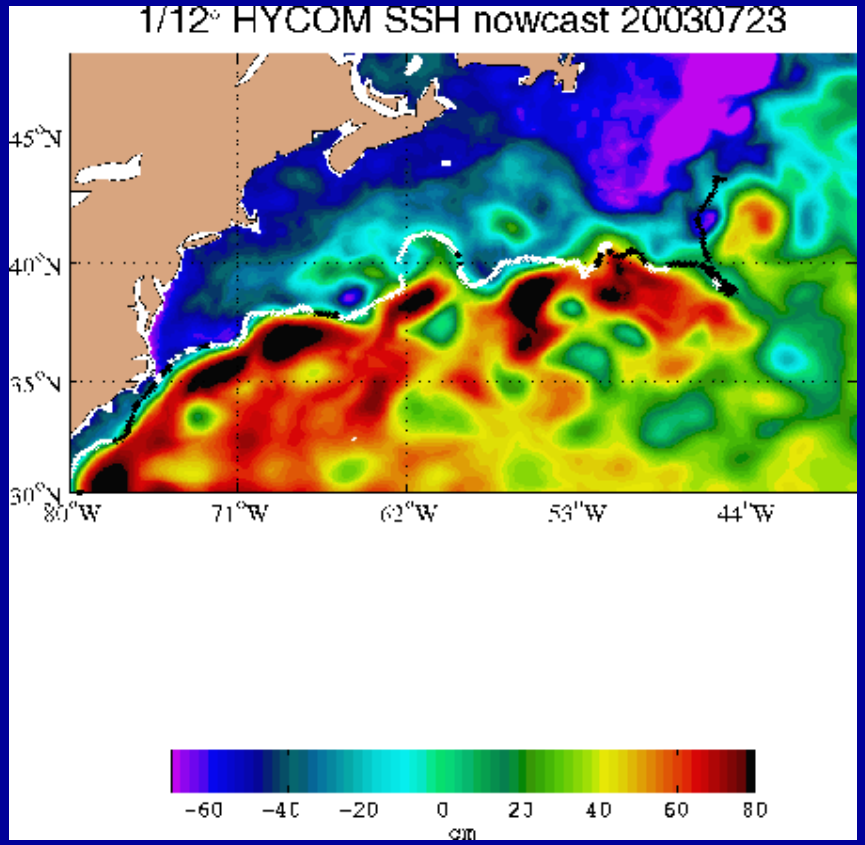
- **Public web page shows the results from the near real-time system**

  http://hycom.rsmas.miami.edu

- **“Internal” web page with additional information**

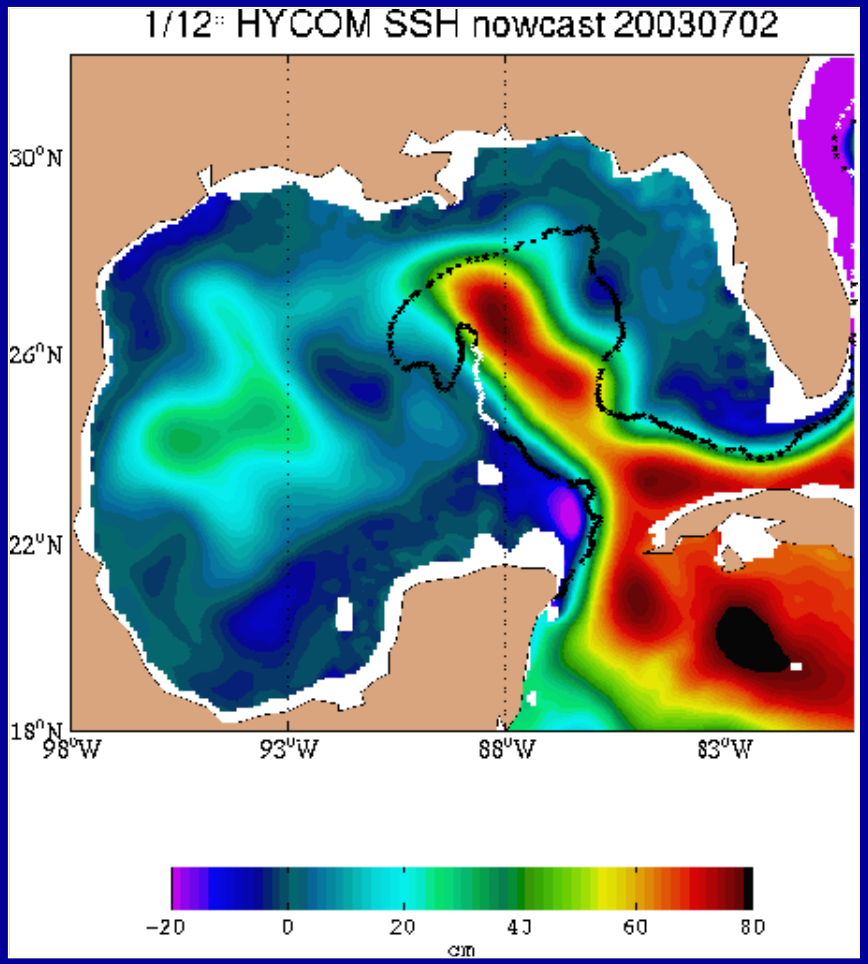
1/12° Atlantic HYCOM SSH in Gulf Stream region

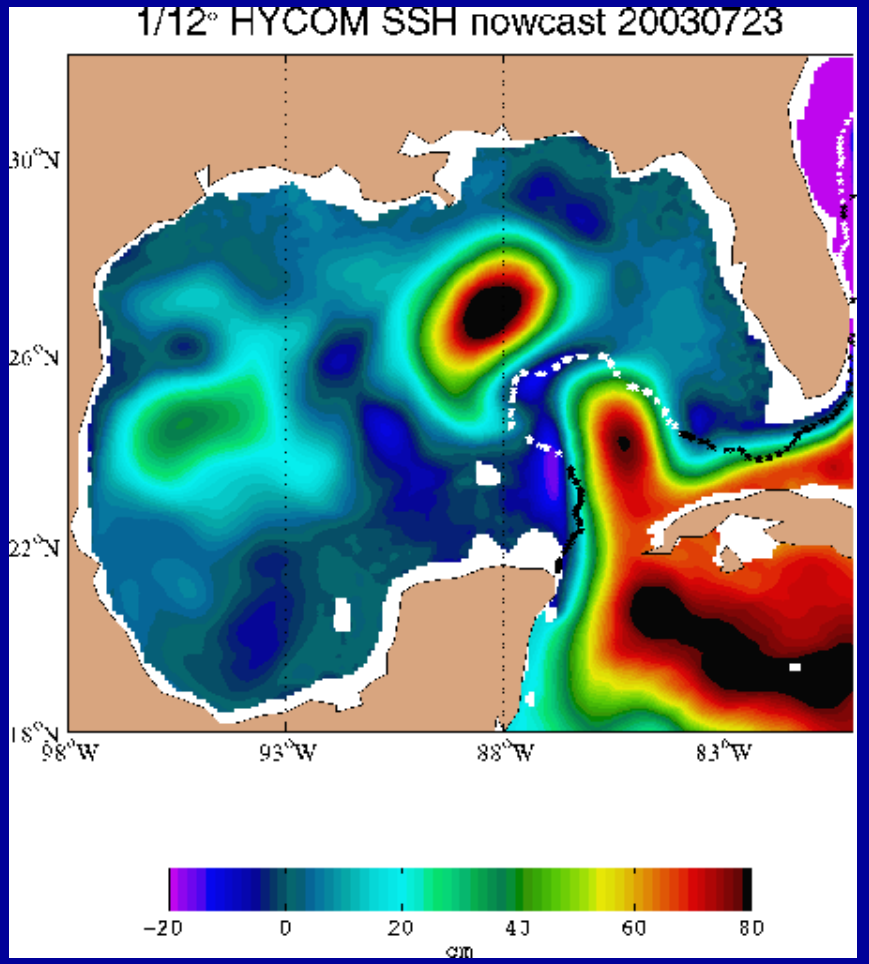




White/black line is the frontal analysis of MCSST observations performed at NAVOCEANO. Black line represents data more than four days old.

1/12° Atlantic HYCOM SSH in Gulf of Mexico region





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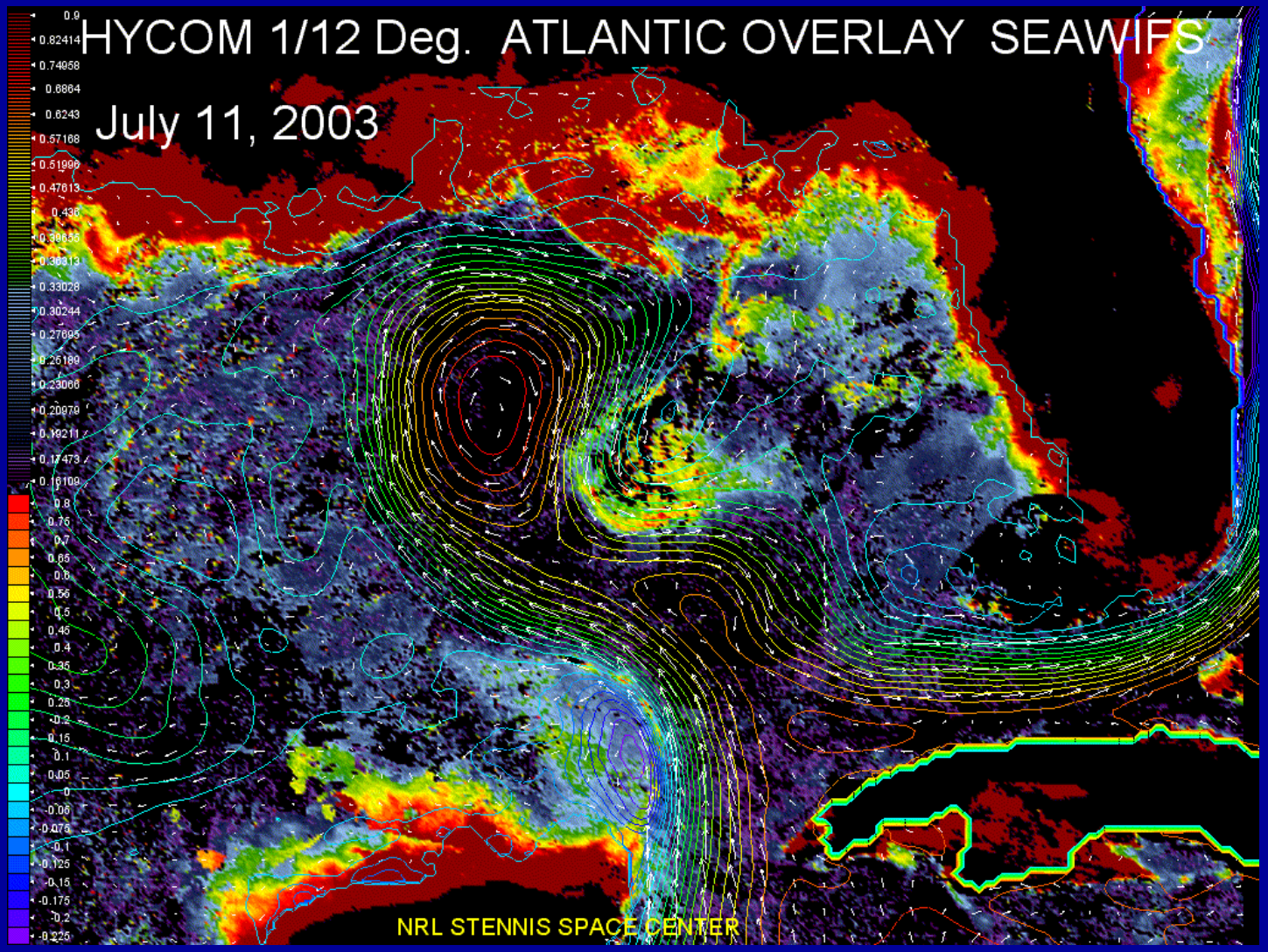
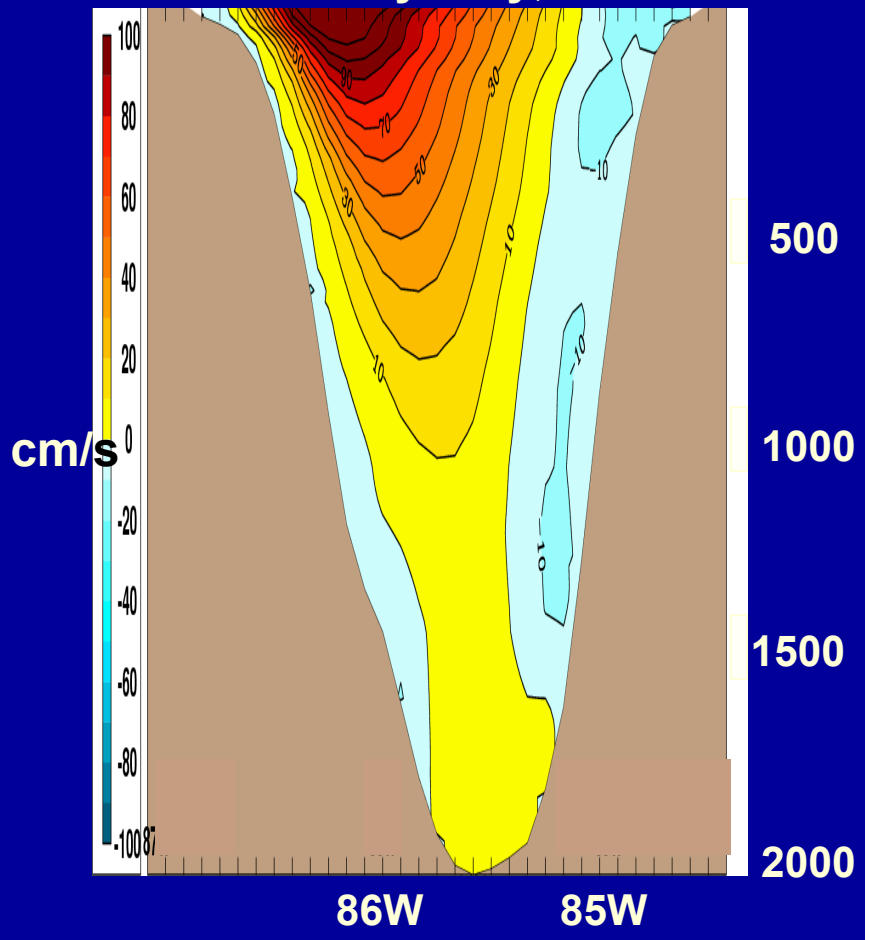
Comparison to SEAWIFS



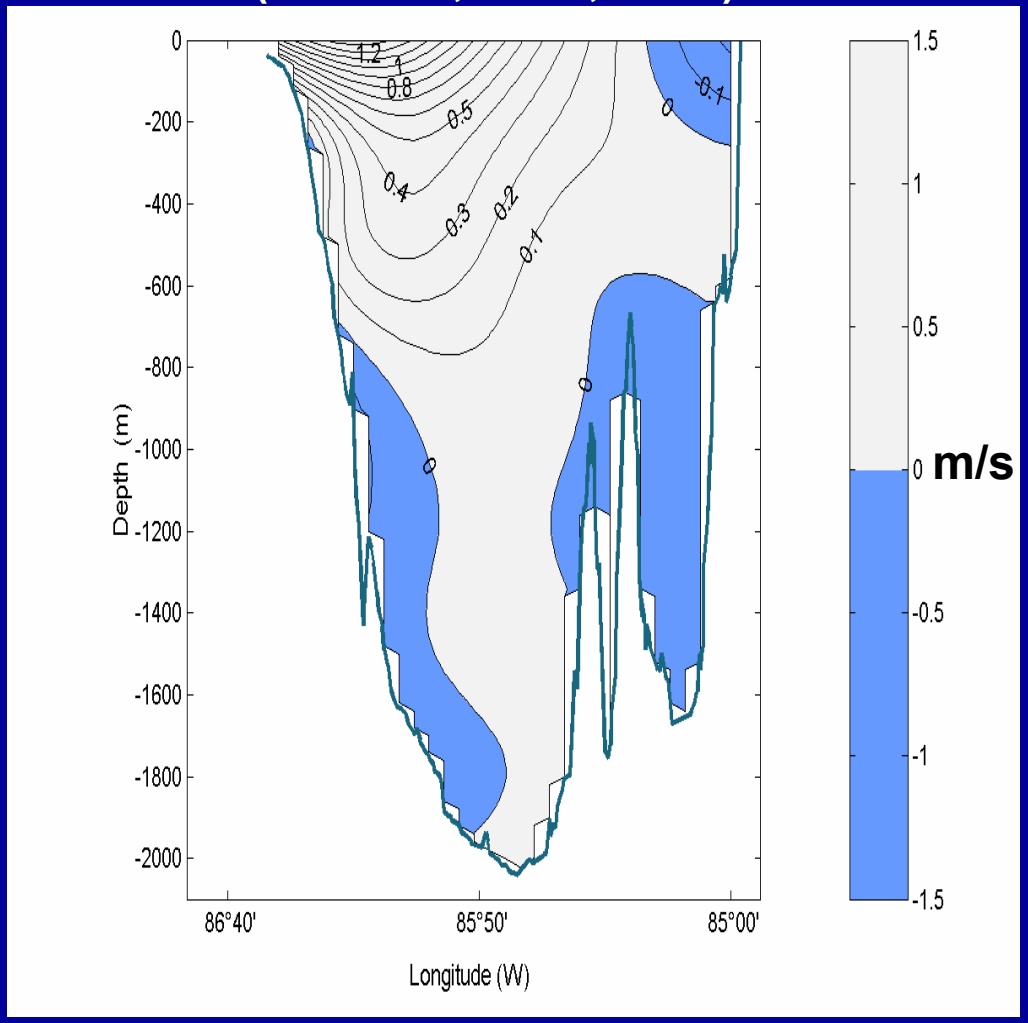
Movie made by P. Flynn, NRL

Yucatan channel normal velocity

1/12° Atlantic HYCOM Mean
January-July, 2003

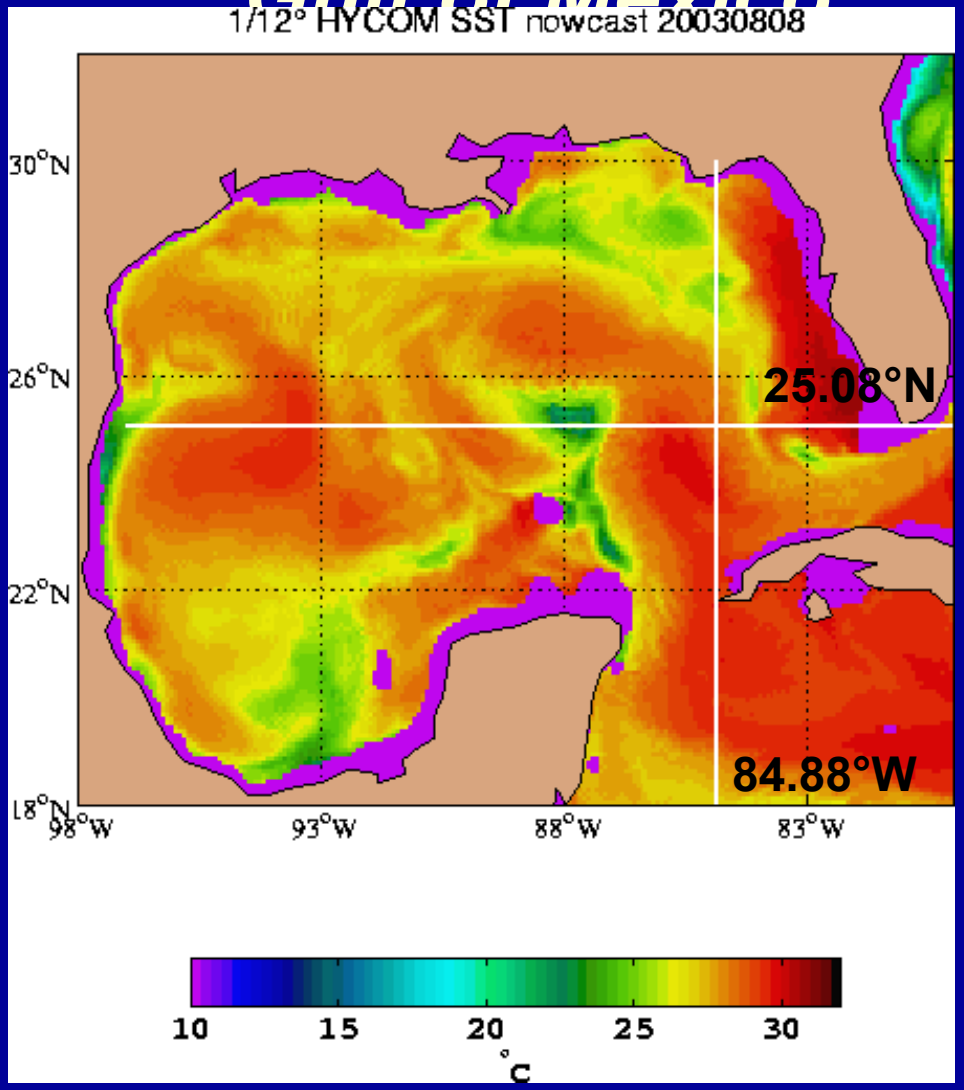


Observed Mean 8/1999-6/2000
(Abascal, et. al, 2001)



Temperature and salinity sections

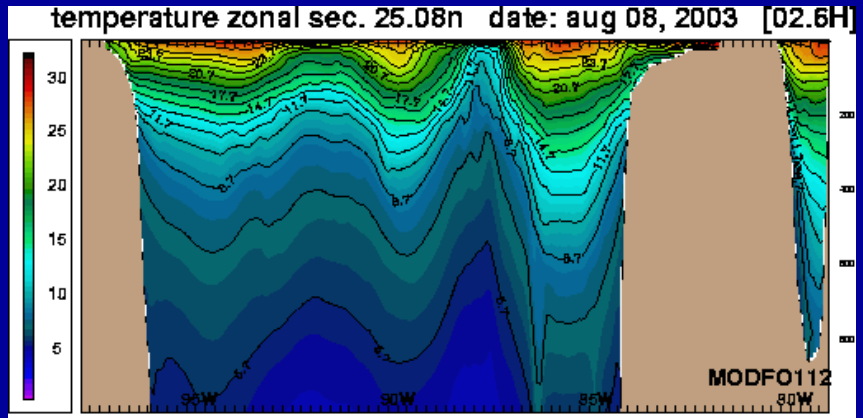
Gulf of Mexico

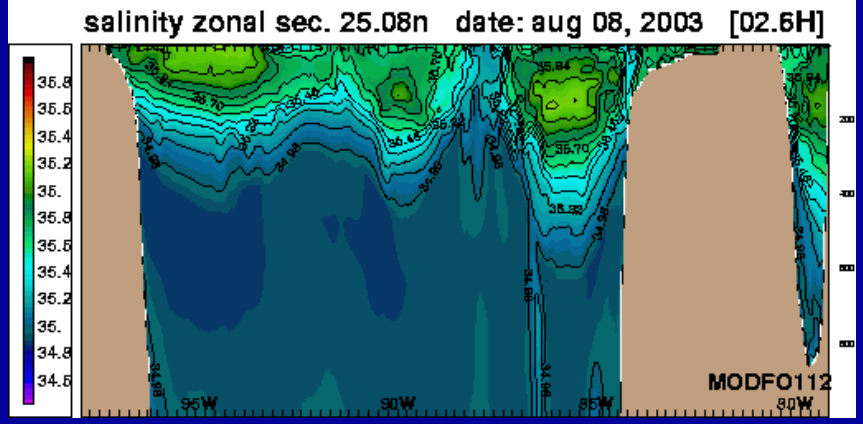


Temperature and salinity sections

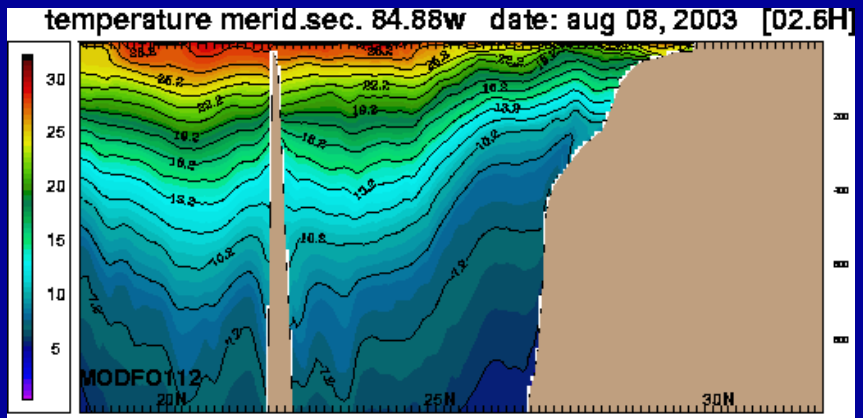
Gulf of Mexico, 8 August, 2003

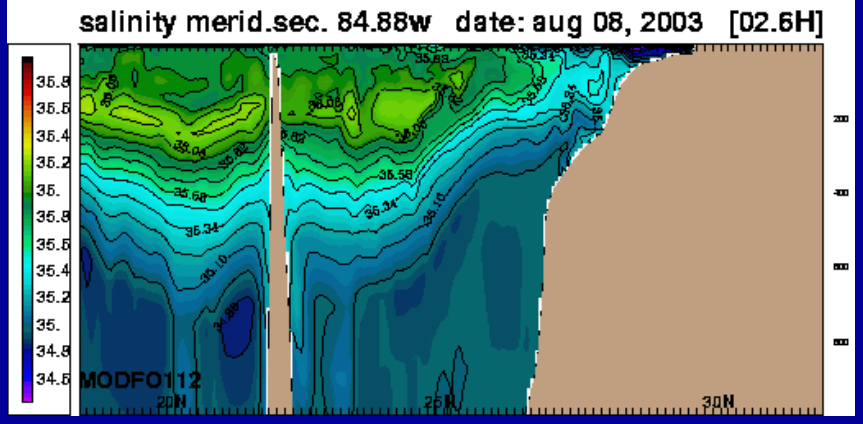
25.08°N





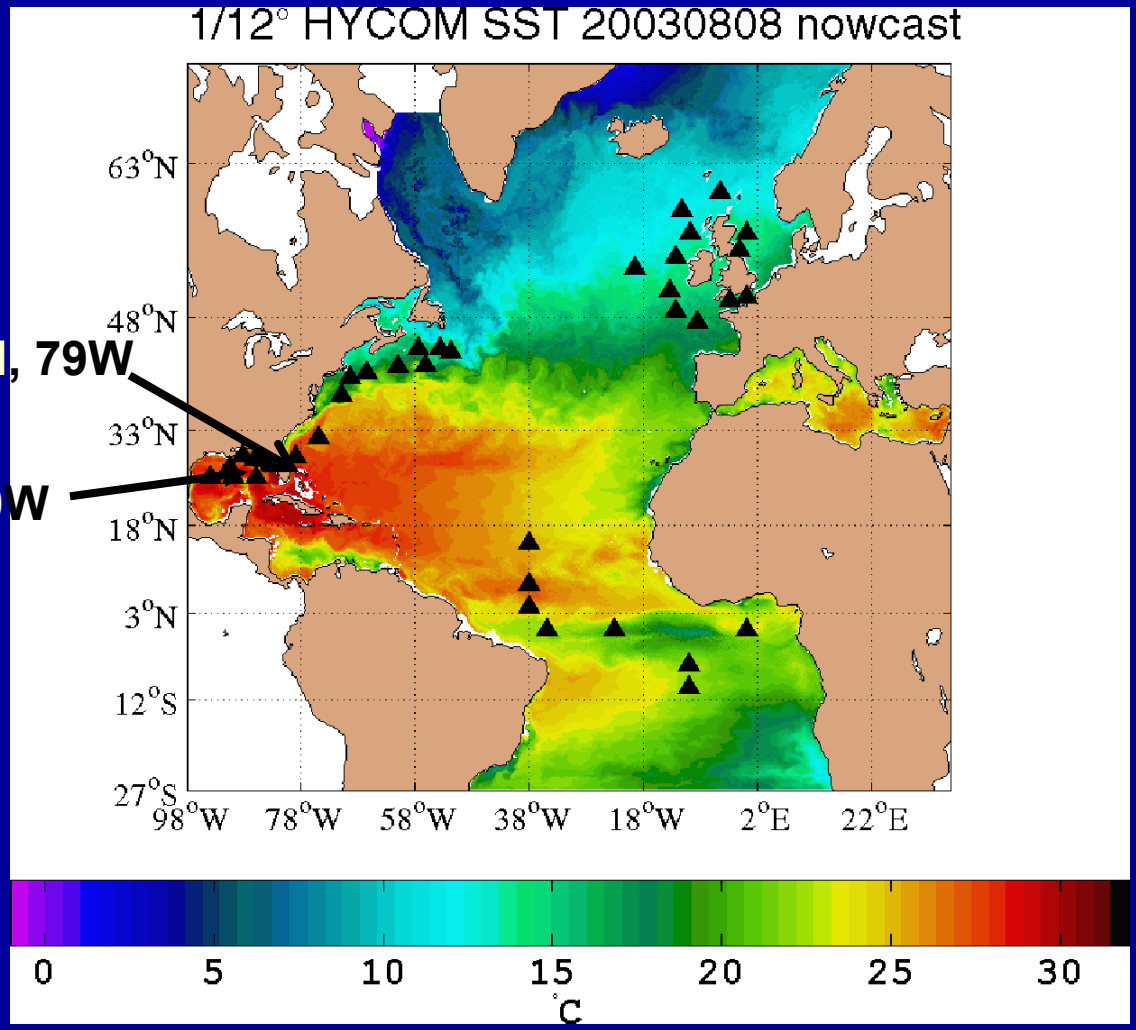
84.88°W





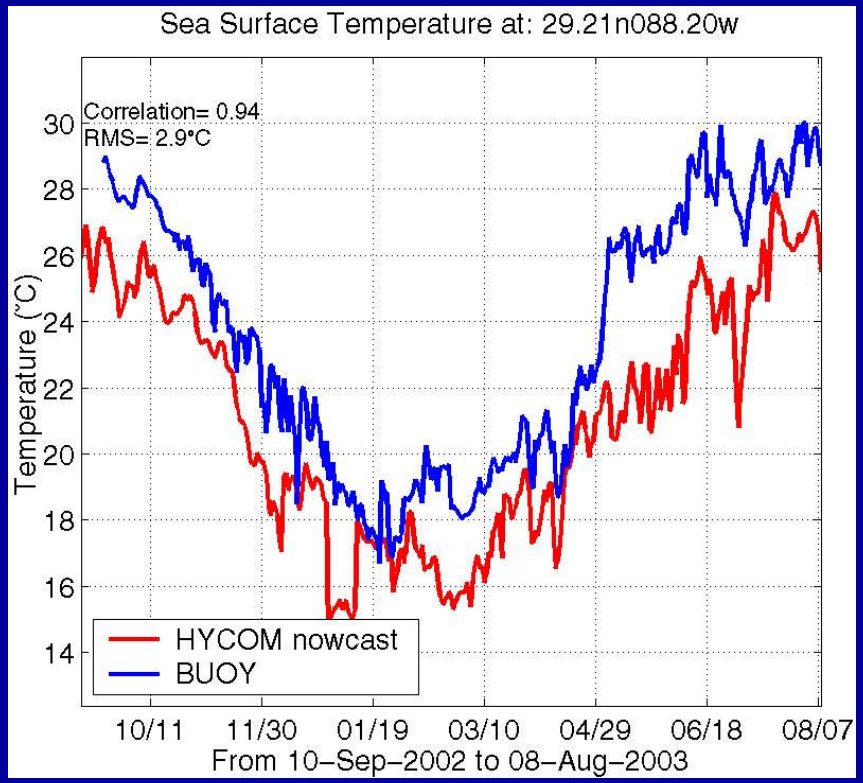
Position of buoys overlaid on SST from the 1/12° Atlantic HYCOM

(no assimilation of SST)

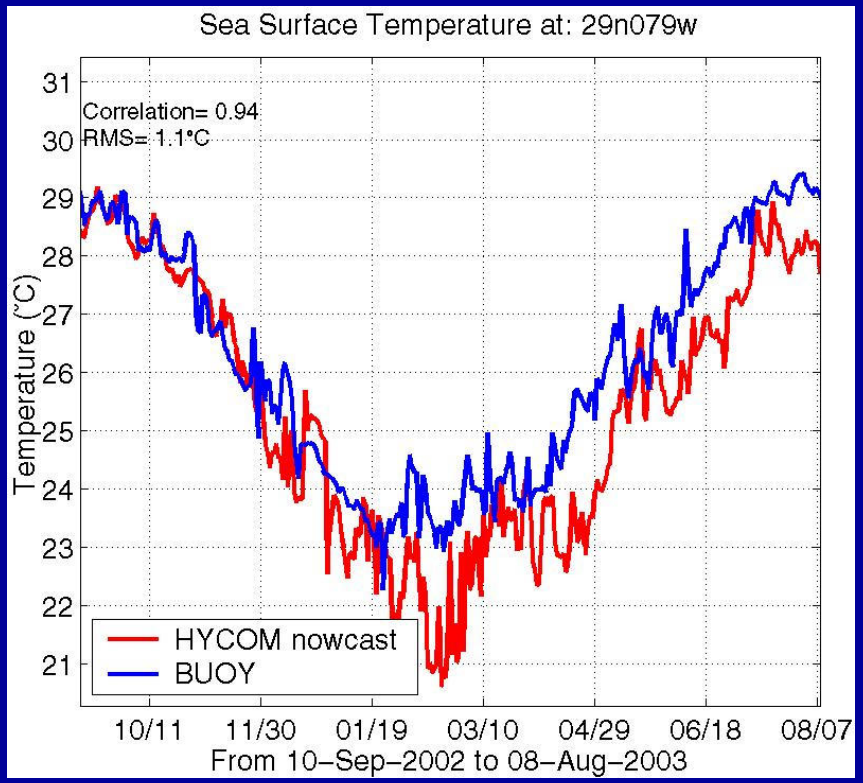


1/12° Atlantic HYCOM SST time series compared to observations from buoys (no assimilation of SST)

NDBC 29.21°N, 88.20°W



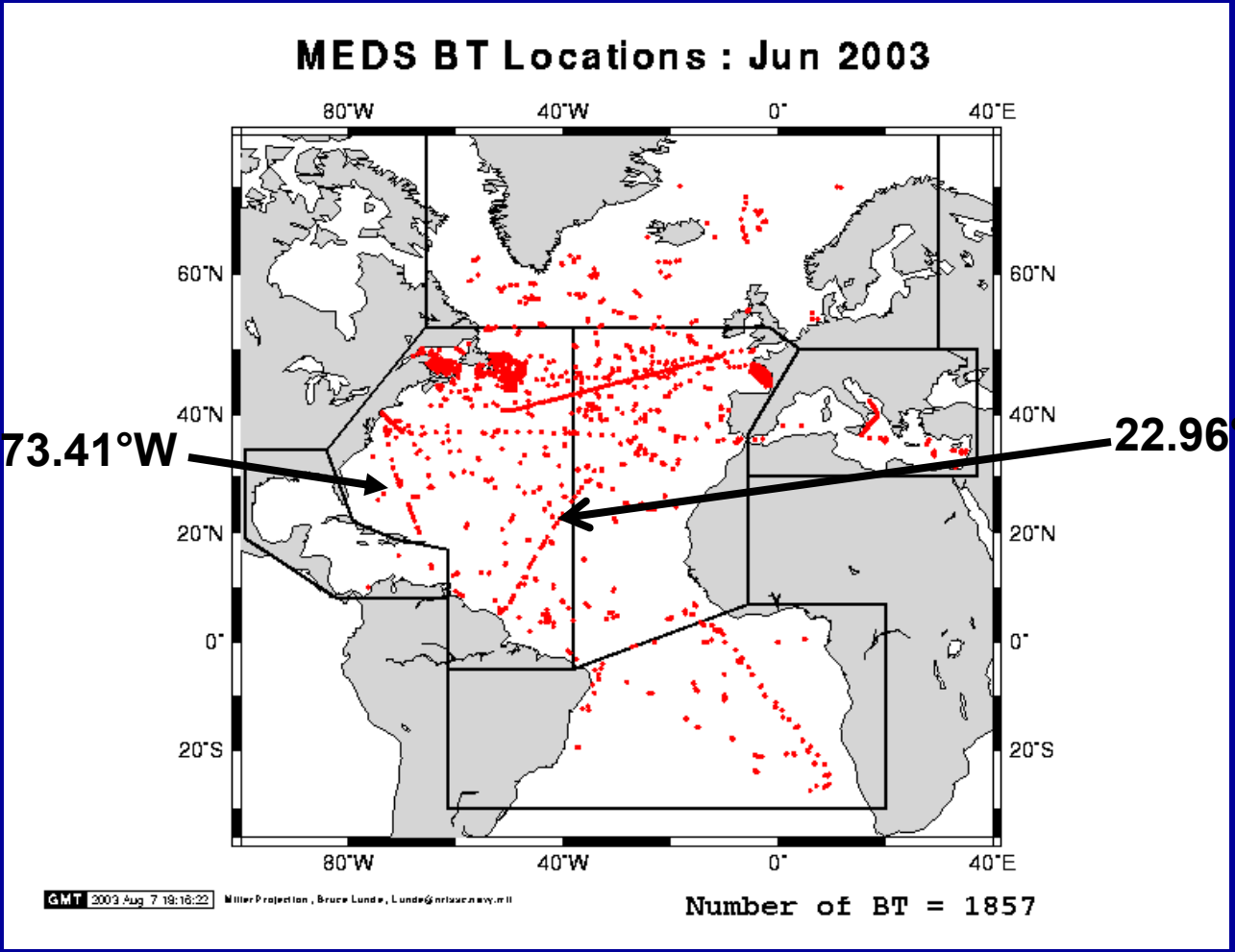
NDBC 29°N, 79°W



Comparison to XBT data

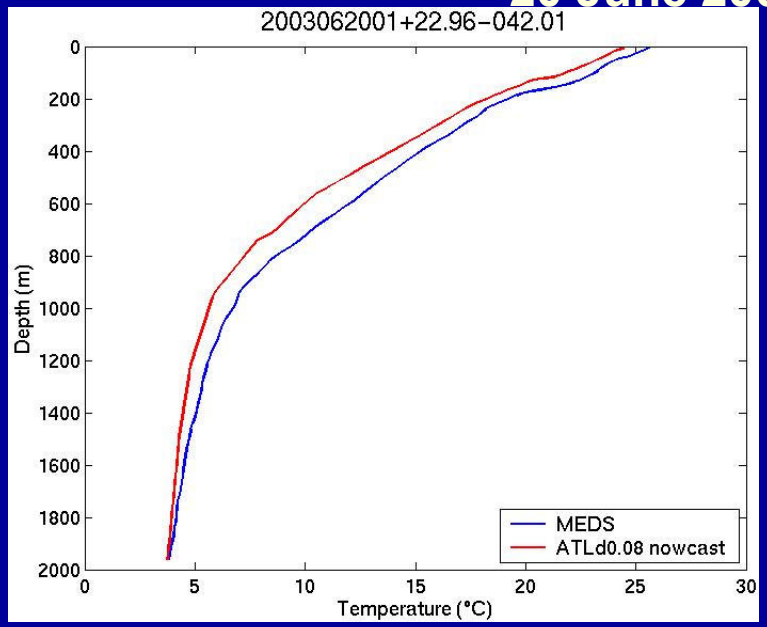
- **MEDS data once a month**
- **Statistics in different regions of the Atlantic domain**
- **Results on “internal” web page**

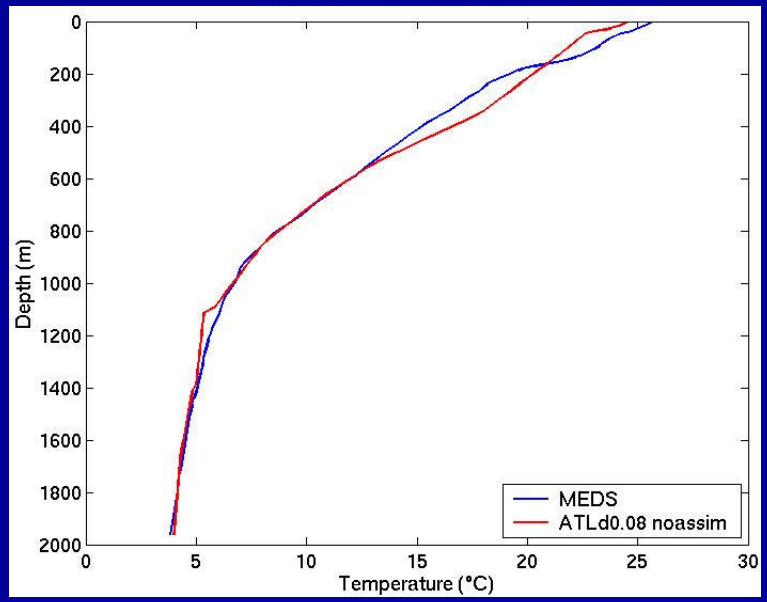
MEDS XBT positions June 2003



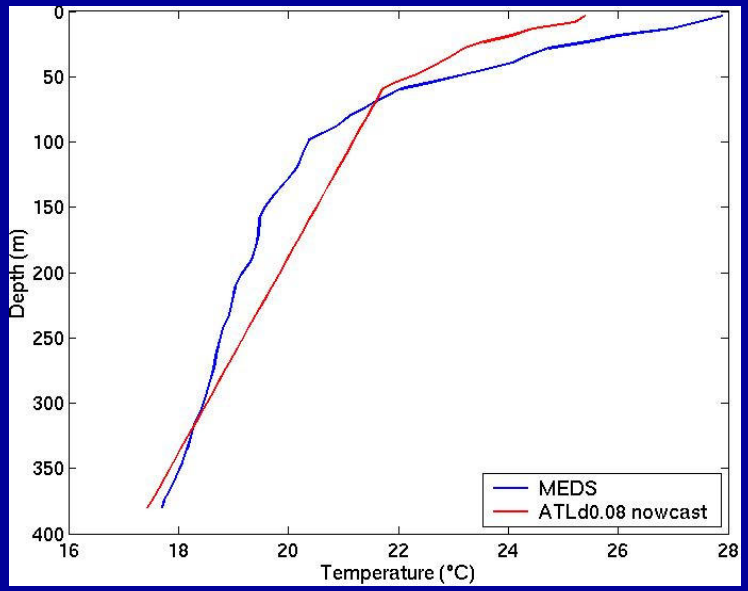
MEDS XBT profiles

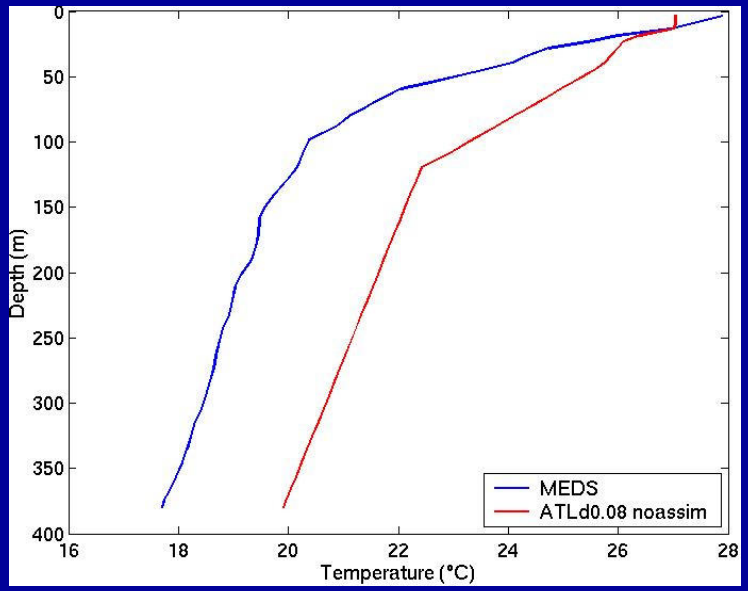
20 June 2003, 22.96°N, 42.01°W





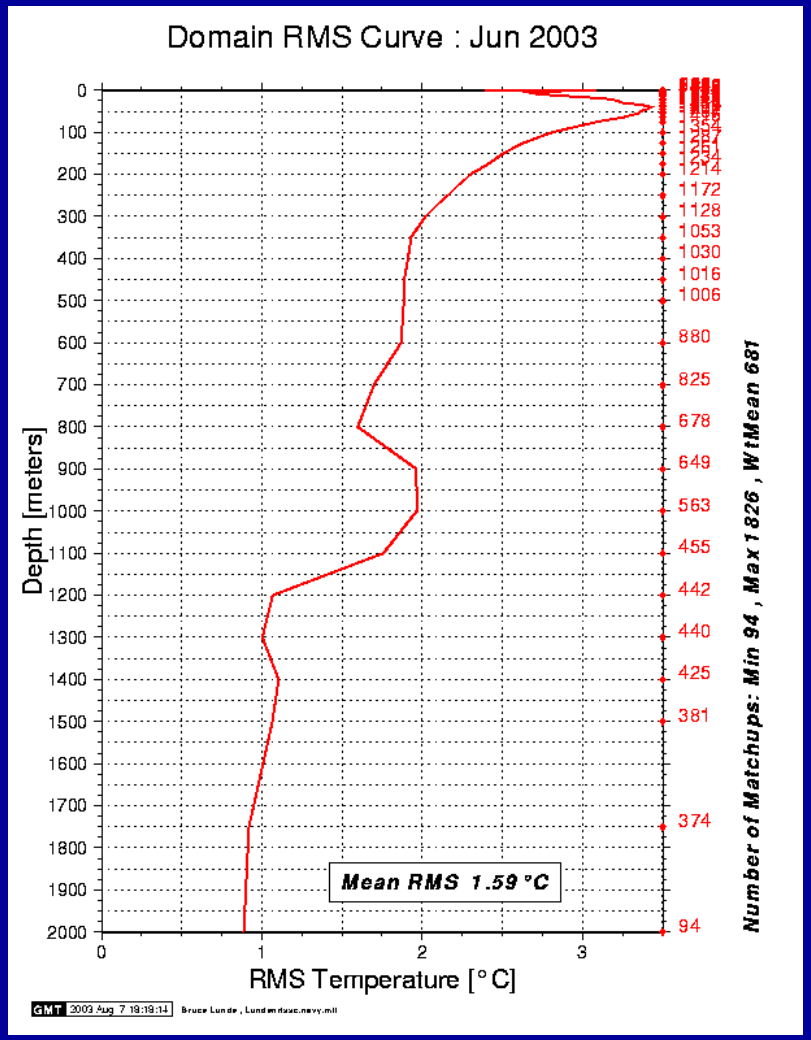
22 June 2003, 27.01°N, 73.41°W

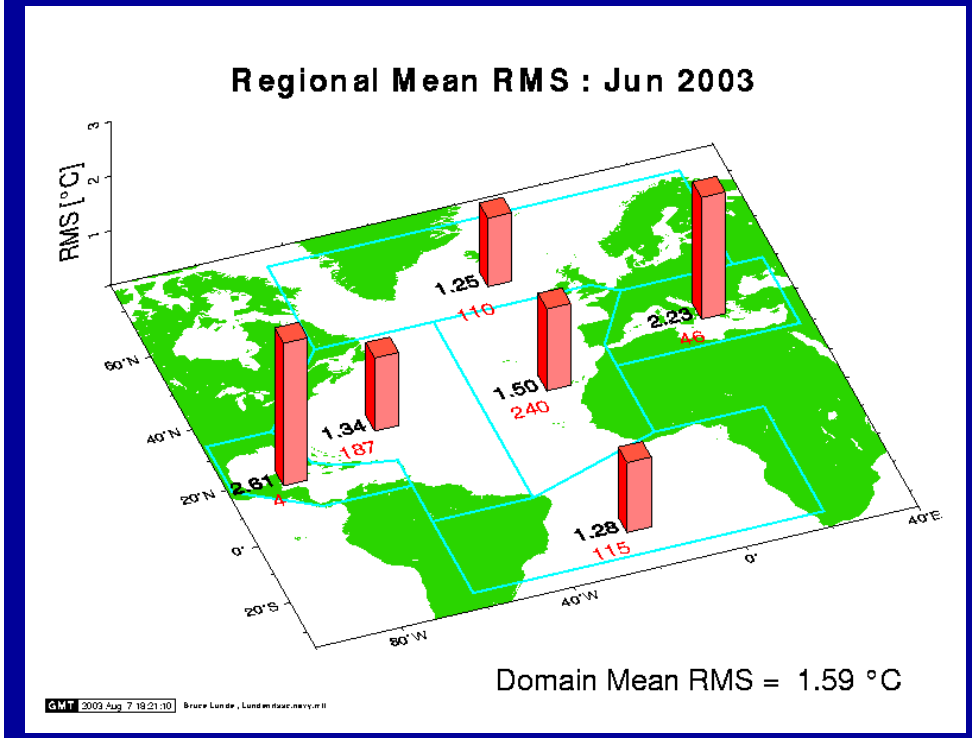




MEDS statistics June 2003

(no assimilation of SST)





Future

- New 5m coastline
- Use the latest code
- Relax to MODAS SST
- 14 day forecast
- Upgrade assimilation (more on Wednesday)
  - Satellite altimeter track observations
  - Combine SSH and XBT assimilation
    - Use MODAS synthetic temperature and salinity profiles
  - Advanced methods (SEEK, ROIF)

http://hycom.rsmas.miami.edu

END

Internal web page

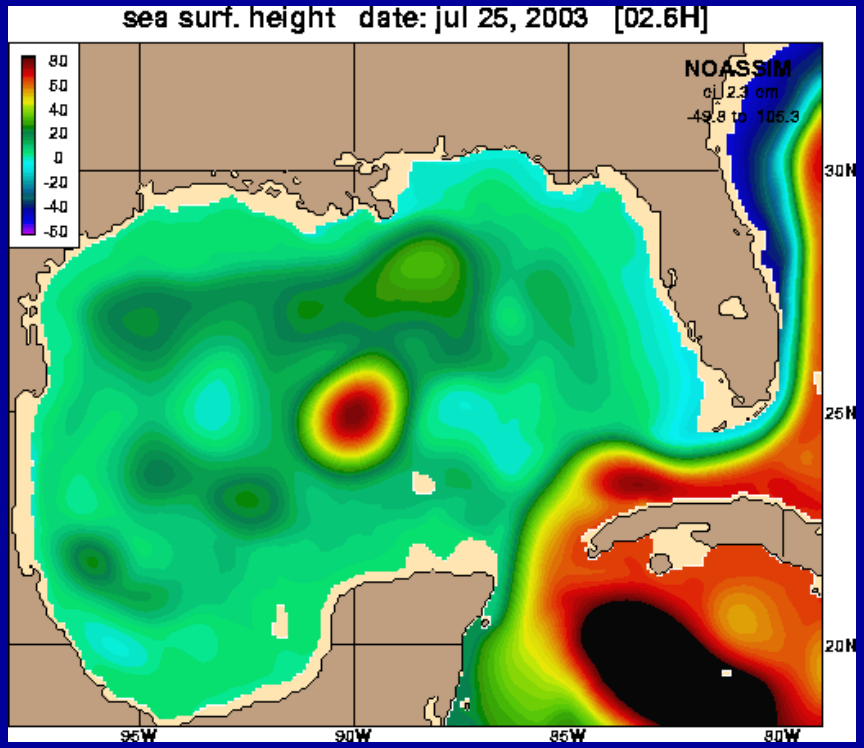
http://www7320.nrlssc.navy.mil/hycom1-12/skill.html

hycom
NRL7320

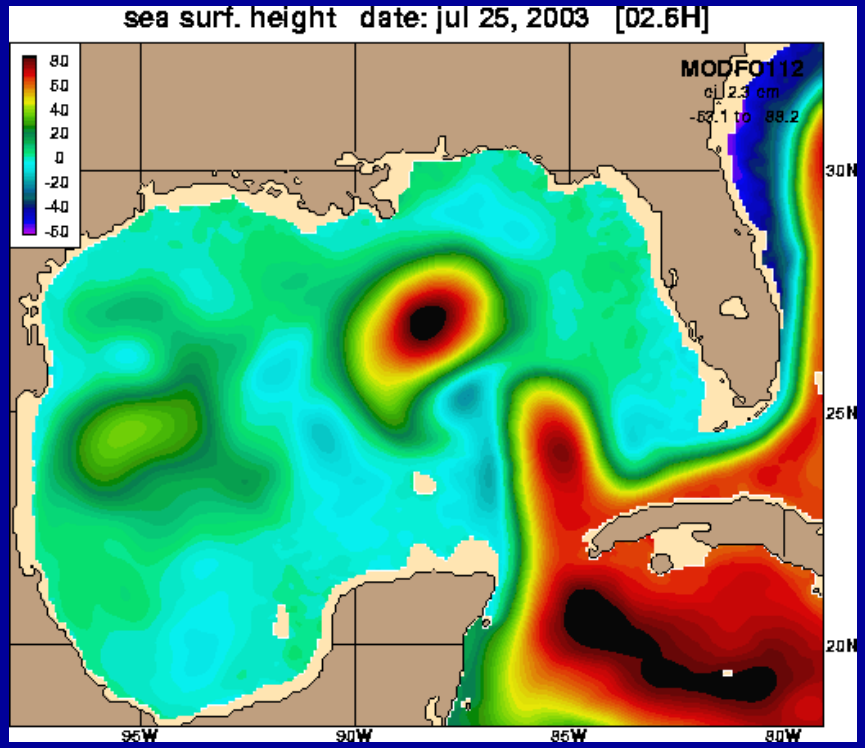
SSH in The Gulf of Mexico

25 July 2003

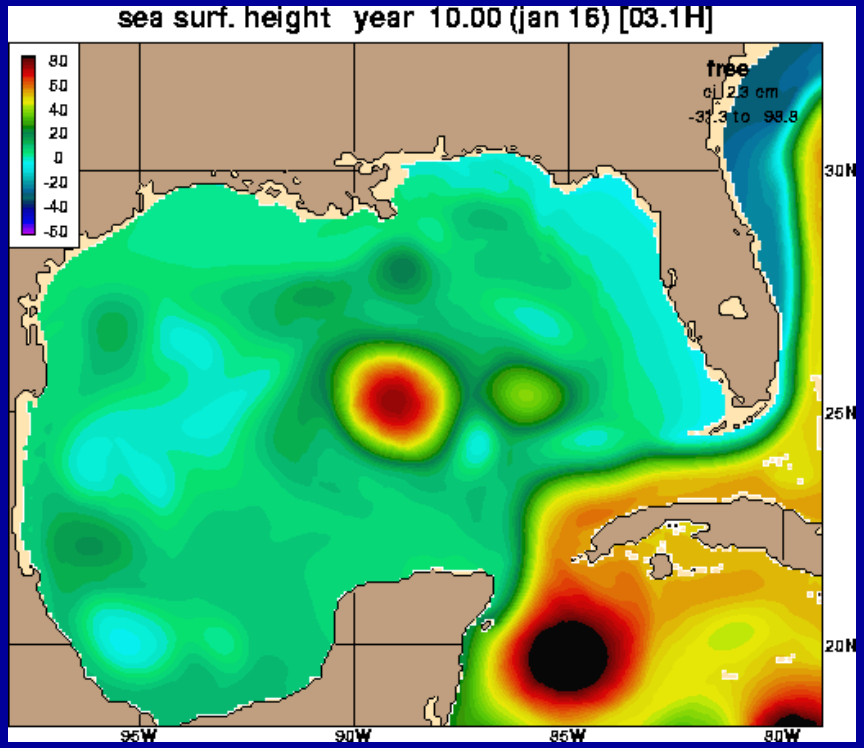
No assimilation



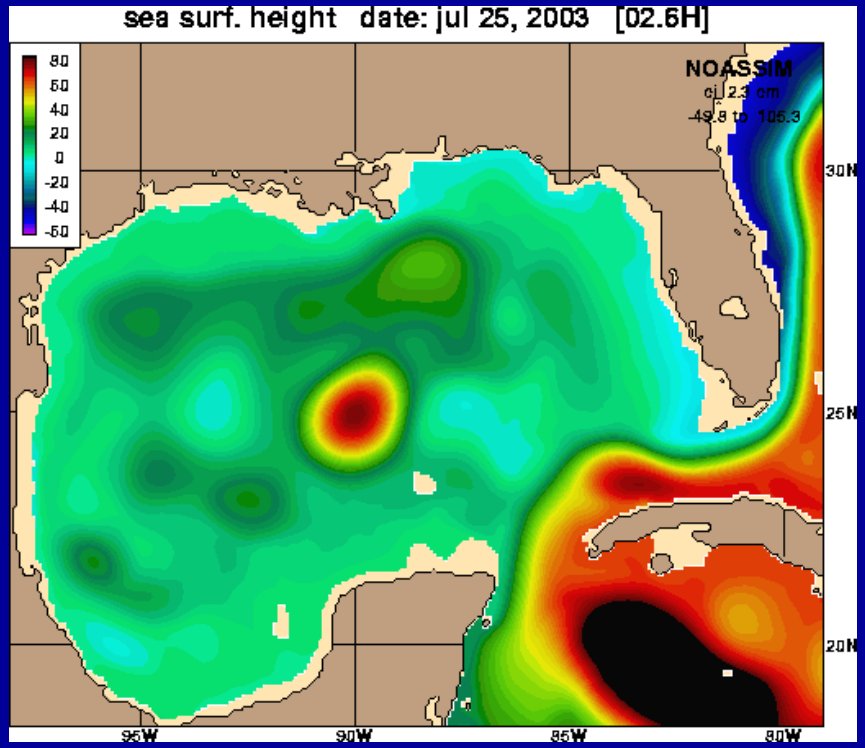
MODAS assimilation



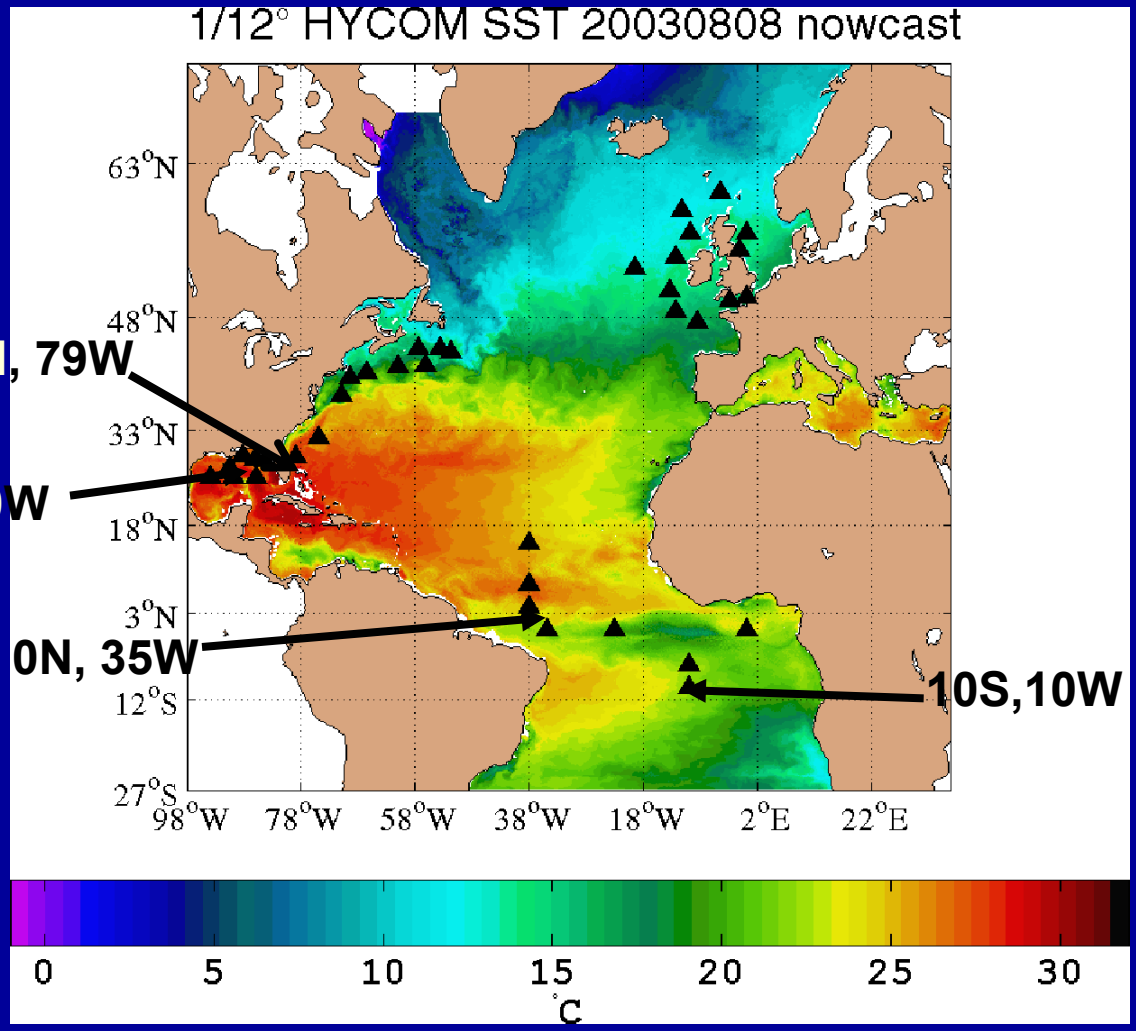
New coastline



Present coastline

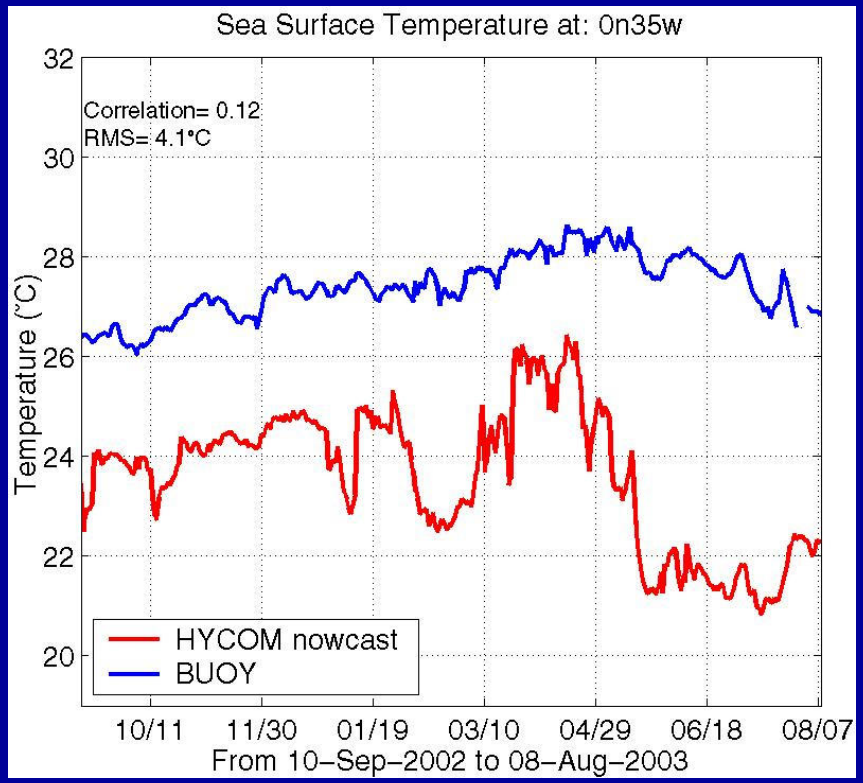


Position of buoys overlaid on SST from the 1/12° Atlantic HYCOM

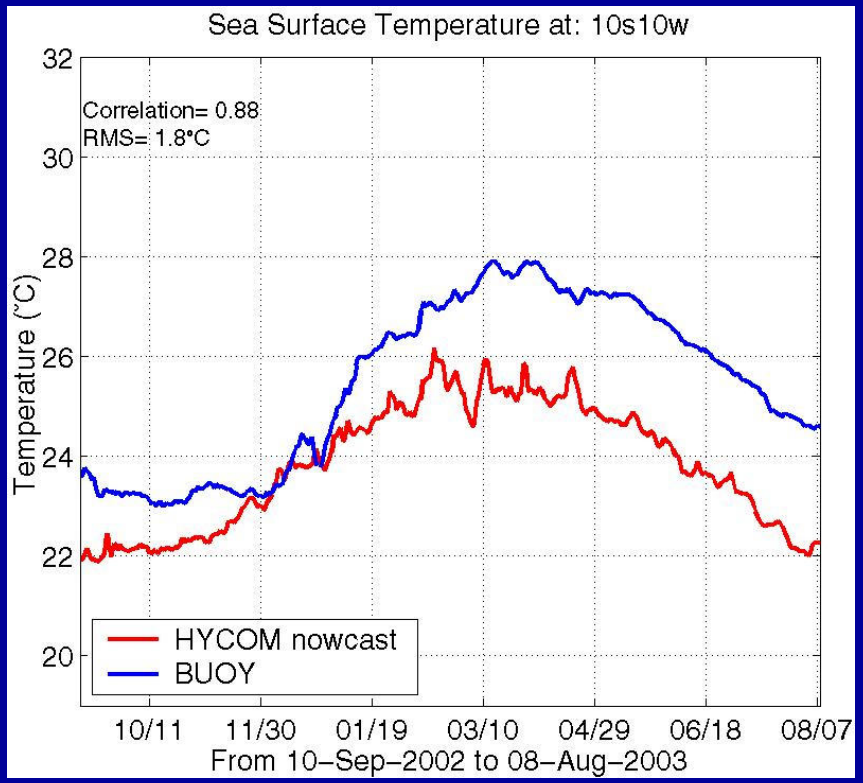


1/12° Atlantic HYCOM SST time series compared to observations from buoys

PIRATA 0°N, 35°W

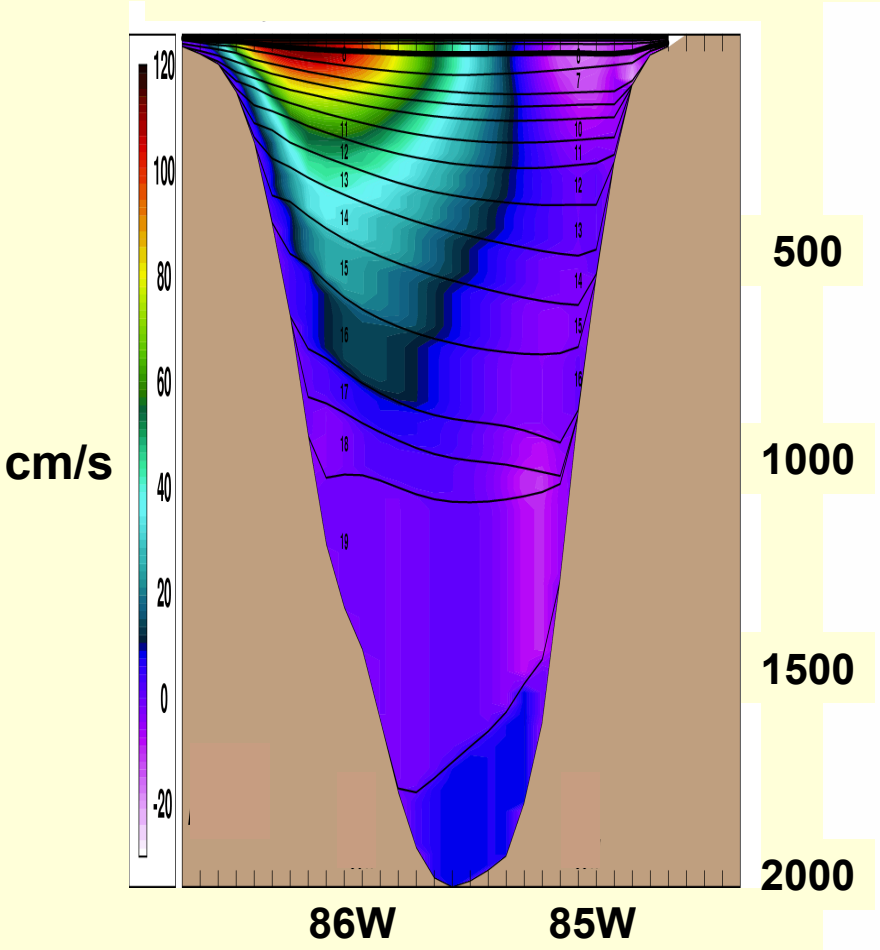


PIRATA 10°S, 10°W



Yucatan Channel Normal Velocity
No Assimilation

1/12° ATL HYCOM 1-Year Mean



Observed Mean 8/1999-6/2000
(Abascal, et. al, 2001)