

Implementation of the NRL Coupled Ocean Data Assimilation (NCODA) system in HYCOM

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***HYCOM NOPP GODAE Meeting
6-8 December 2005
RSMAS***

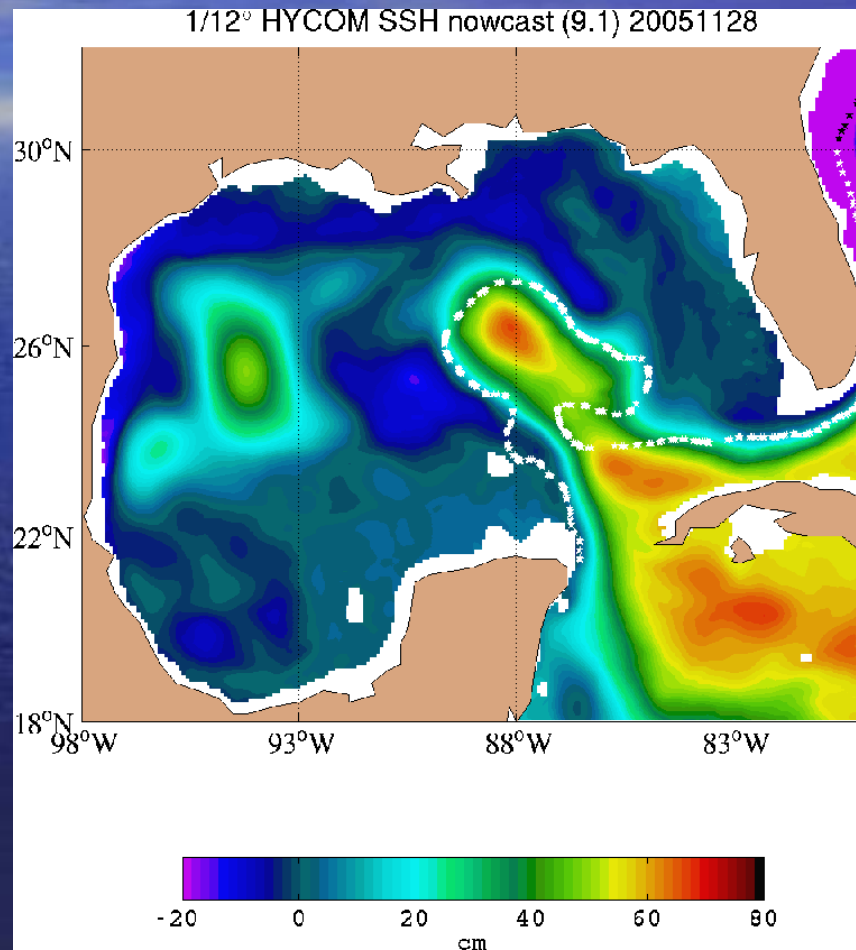
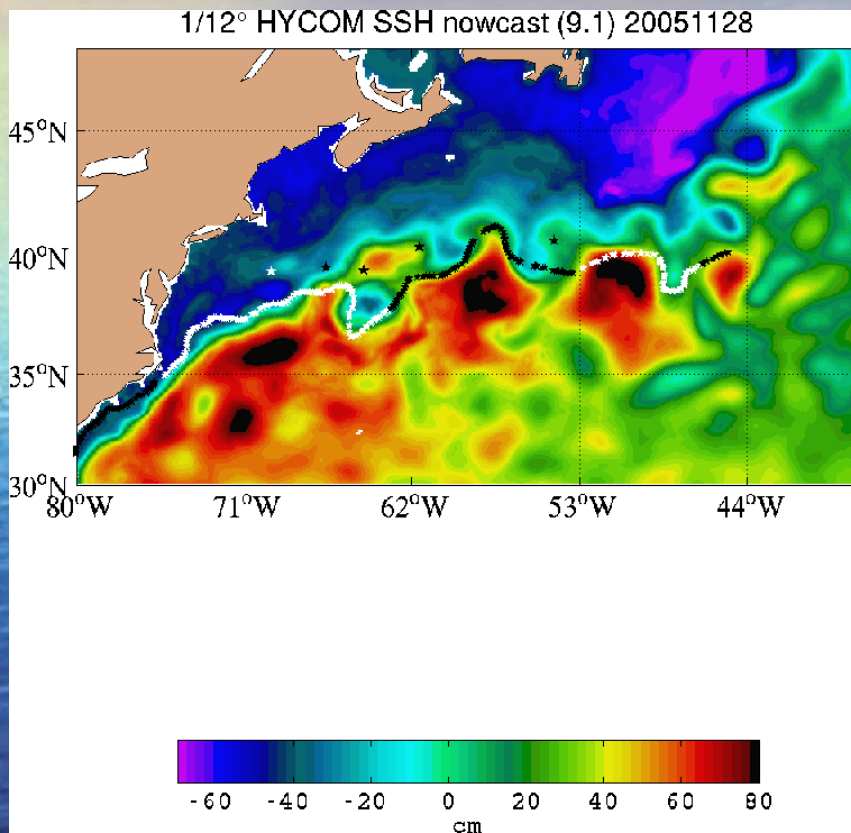
Present system

- 1/12° Atlantic (28°S to 70°N)
- Running in near real-time (on Wednesday)
 - . Assimilates the satellite altimeter analysis from the MODAS operational system at the Naval Oceanography Office (NAVOCEANO)
 - . Mean SSH from the 1/12° MICOM (ECMWF)
 - . Vertical projection via the Cooper and Haines technique (1996, JGR)
 - . FNMOC/NOGAPS atmospheric forcing
 - . Relaxation to the MODAS SST analysis
- 10 day hindcast, 14 day forecast
- Automated scripts run the system from the preprocessing of the forcing fields to the post processing of the results
- Participating in the MERSEA model inter-comparison

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1/12° Atlantic HYCOM

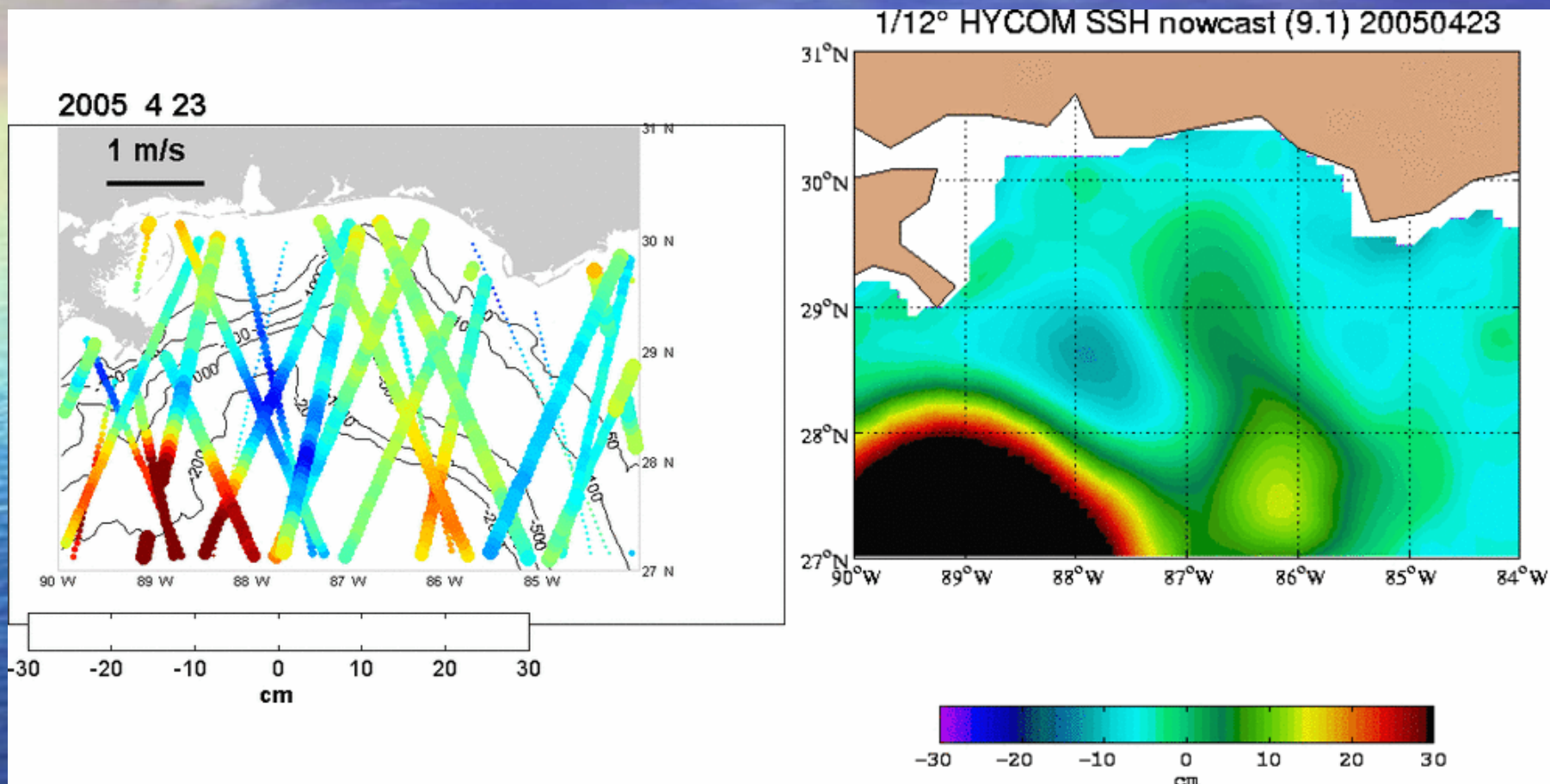
SSH in Gulf Stream region, 23 November, 2005



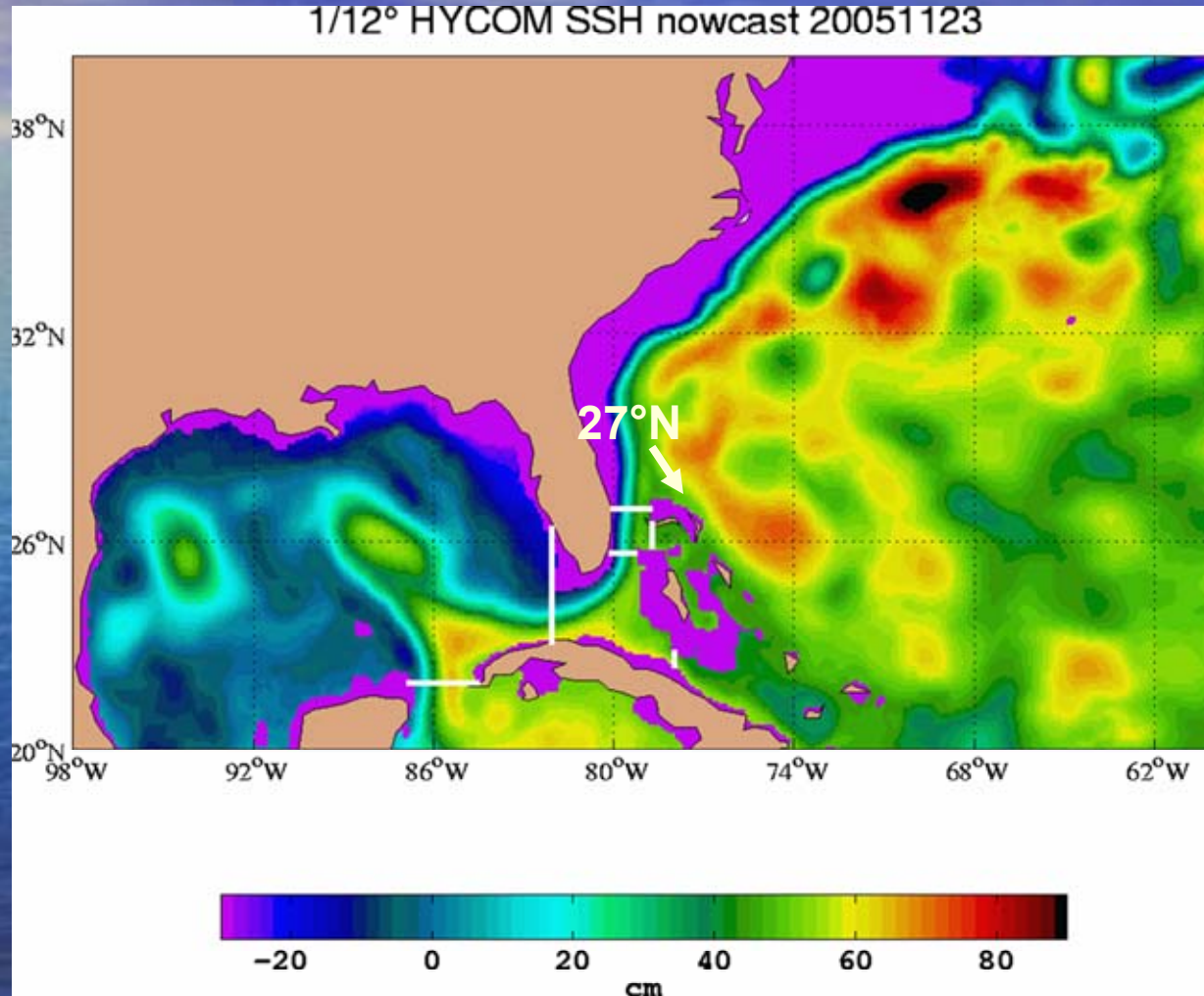
White/black line is the frontal analysis of MCSST observations performed at NAVOCEANO. Black line represents data more than four days old.

1/12° Atlantic HYCOM

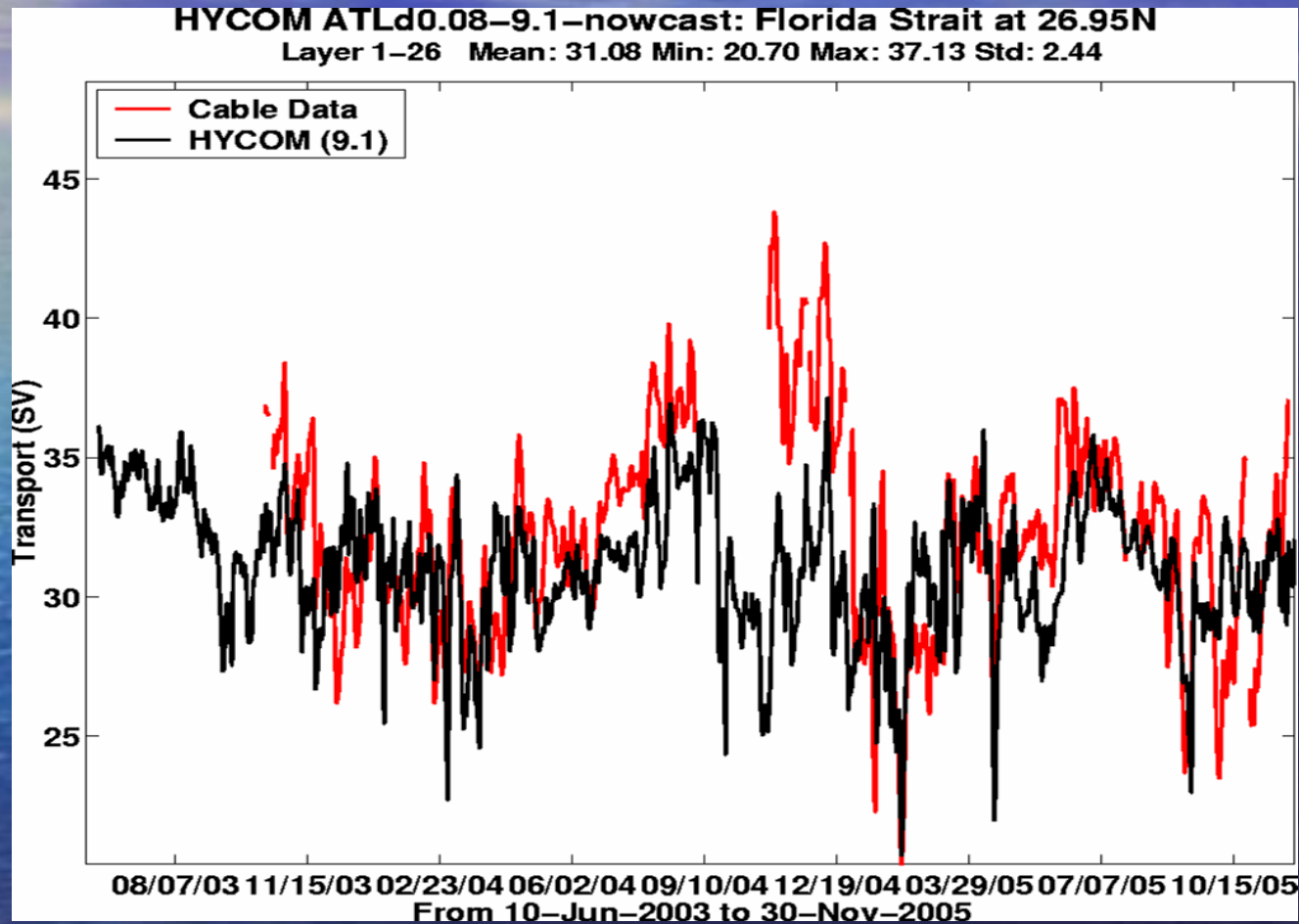
SSH in Gulf of Mexico region (SEED)



Transport sections



Florida Current transport at 27°N



Cable data: <http://www.aoml.noaa.gov/phod/floridacurrent/>

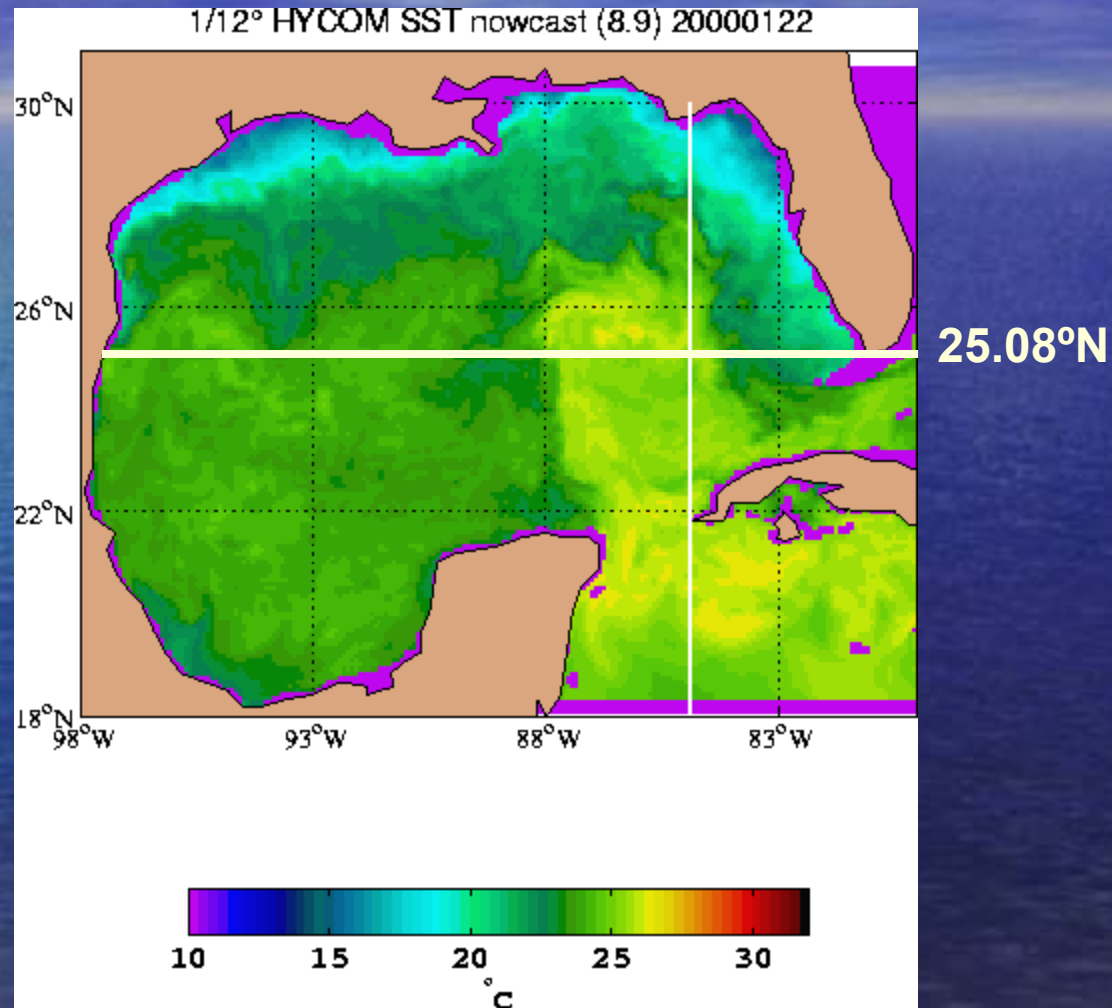
GULF OF MEXICO MODEL CONFIGURATION

- Horizontal grid: $1/12^\circ$ (258 x 175 grid points, 6.5 km spacing on average)
- 18°N to 31°N
- 20 vertical coordinates
- Bathymetry: 5m coastline
- Surface forcing from FNMOC/NOGAPS
- Monthly river runoff
- Nested Boundary:
 - relaxation to the $1/12^\circ$ Atlantic HYCOM T, S, U and V along open boundary, (no assimilation in these experiments)

HYCOM/NCODA coupling

- **HYCOM to 3D z-grid**
- **NCODA analysis**
- **Use the NCODA analysis of T, S to create a new restart file. Let hybgen move the interfaces**
or
- **Use the NCODA analysis of T, S and layer pressure to create a new restart file.**
- **A new analysis every day in these experiments**

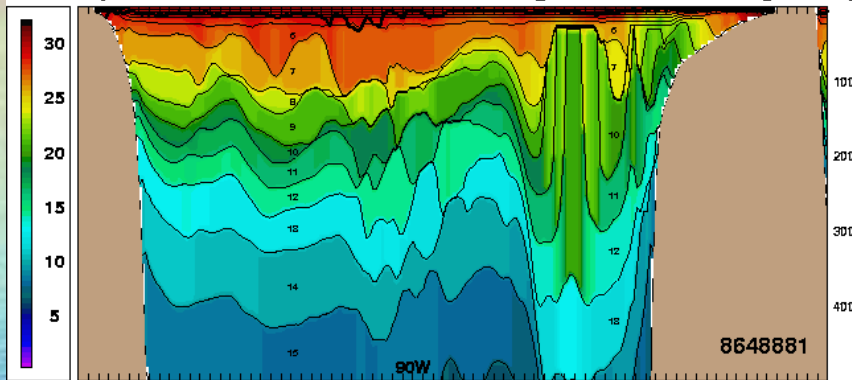
Sections in the Gulf of Mexico



T and ρ section along 25.08°N, 31 August 1999

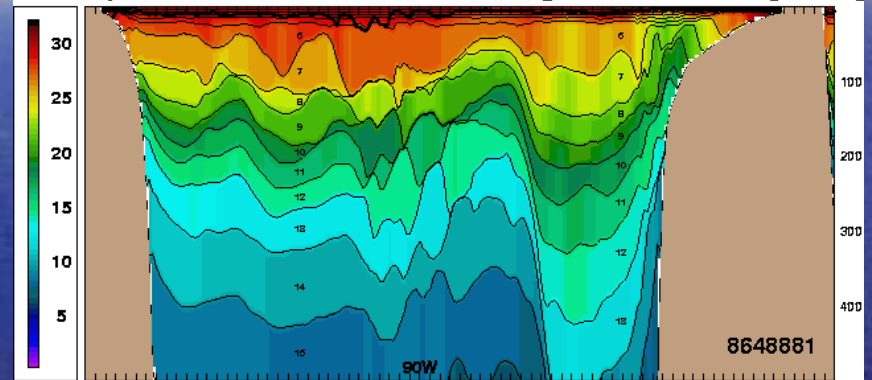
T and S updating

temperature zonal sec. 25.08n Aug 31, 1999 00Z [08.4H]

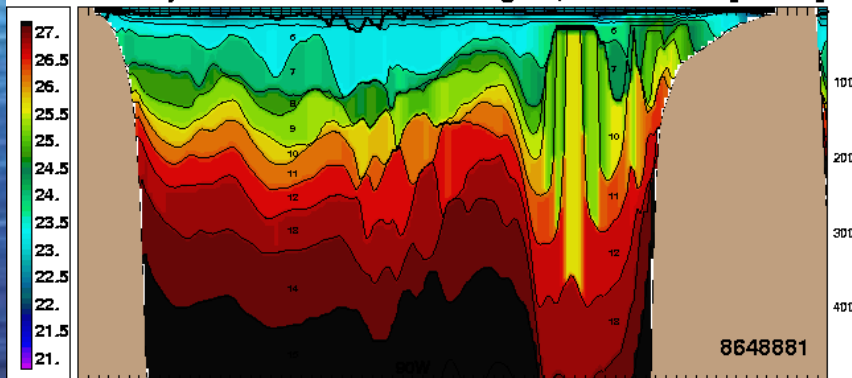


T and S updating, new hybgen

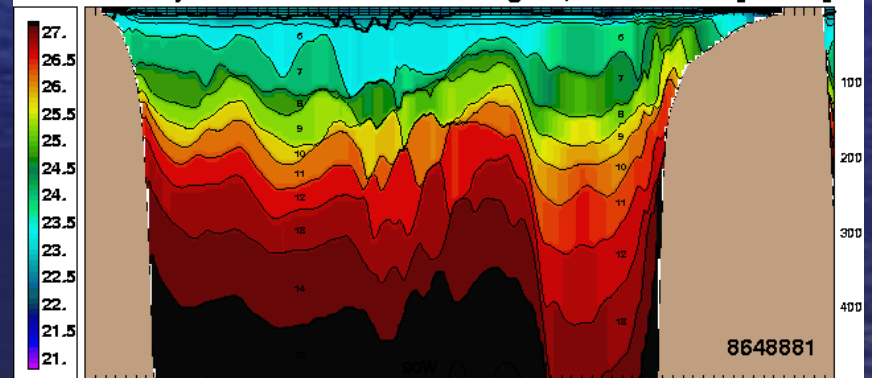
temperature zonal sec. 25.08n Aug 31, 1999 00Z [08.3H]



density zonal sec. 25.08n Aug 31, 1999 00Z [08.4H]



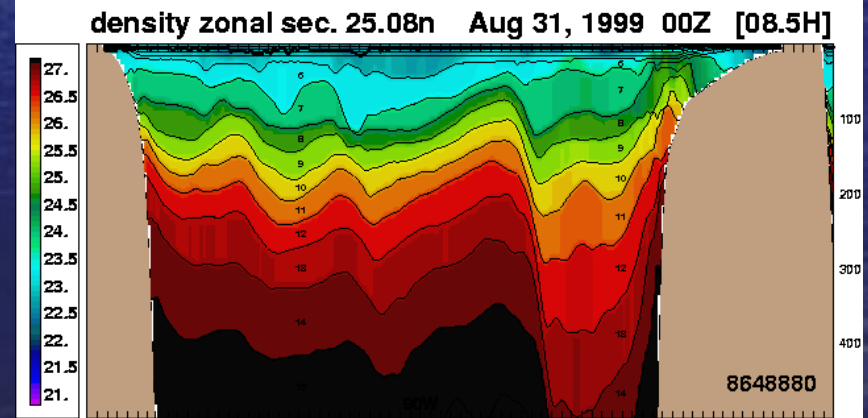
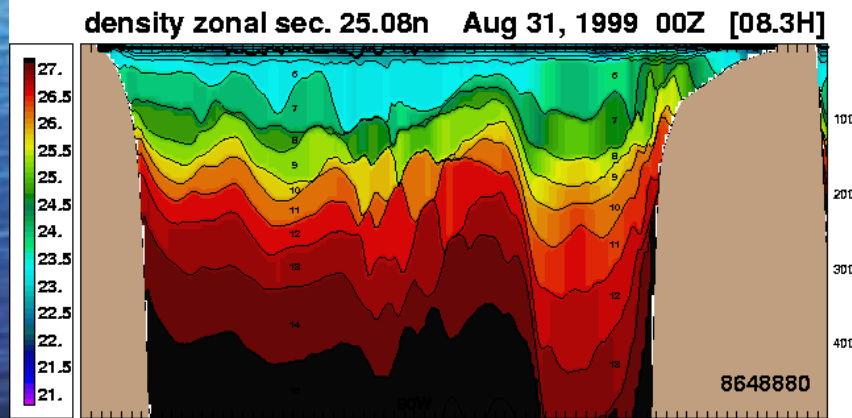
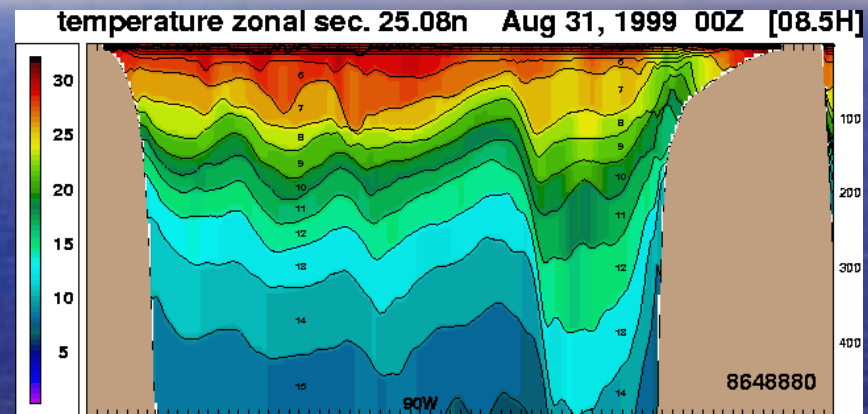
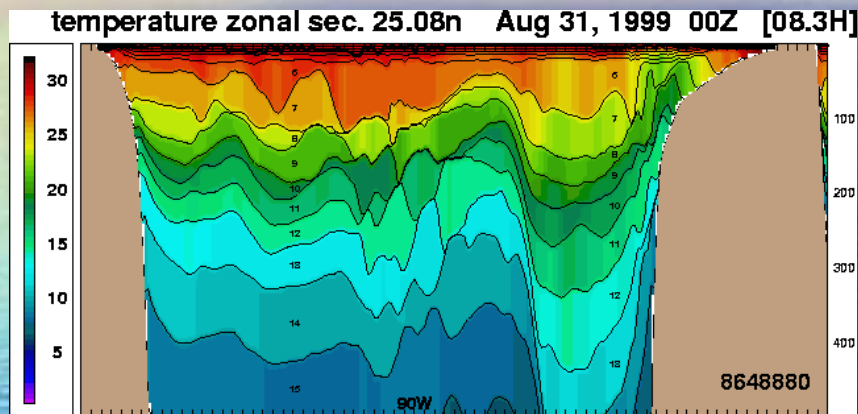
density zonal sec. 25.08n Aug 31, 1999 00Z [08.3H]



T and ρ section along 25.08°N, 31 August 1999

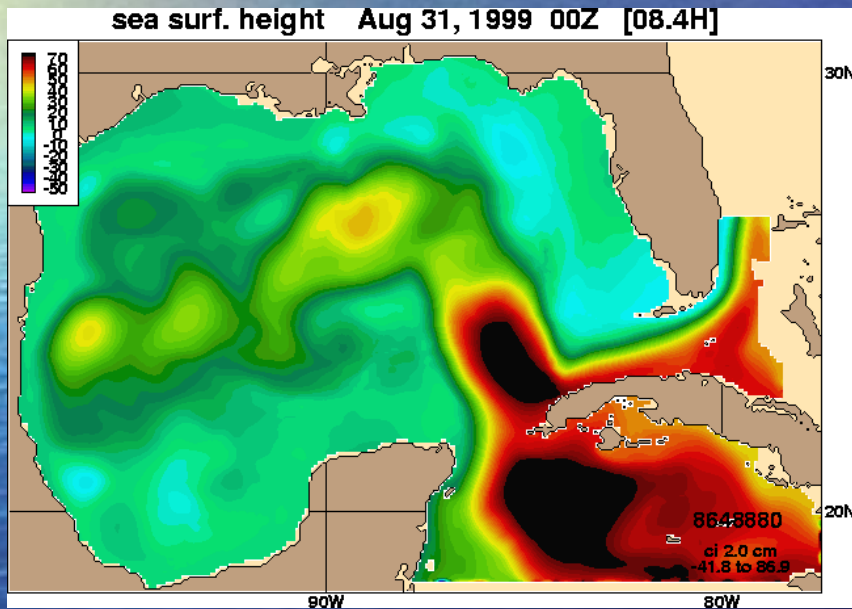
T and S updating, new hybgen

T, S and dp updating

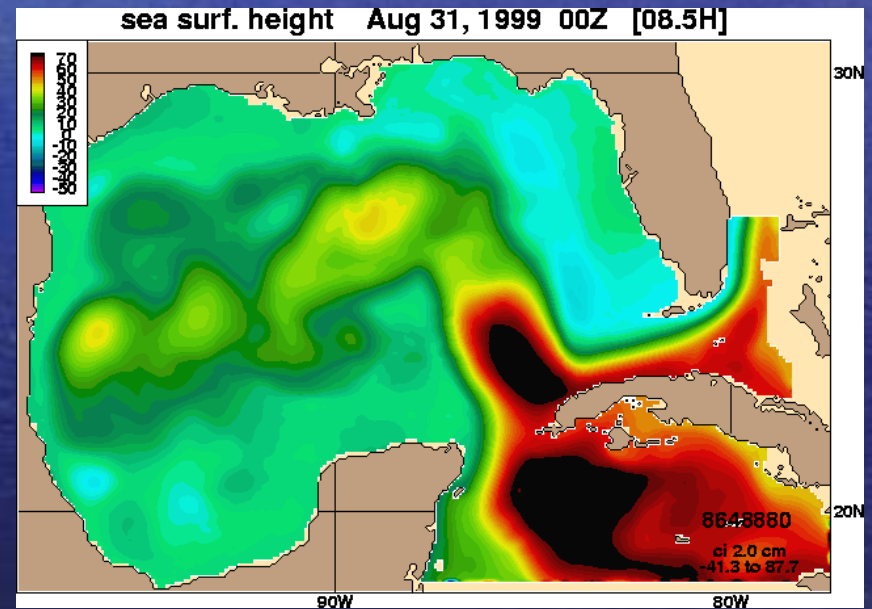


SSH, 31 August 1999

T and S updating

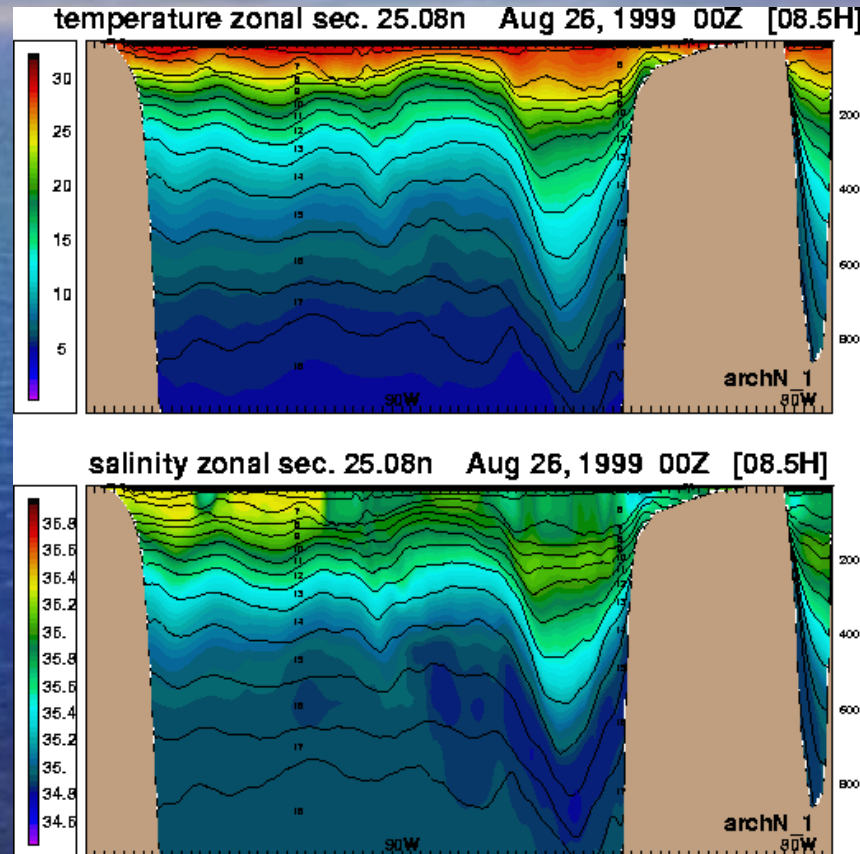


T, S and dp updating

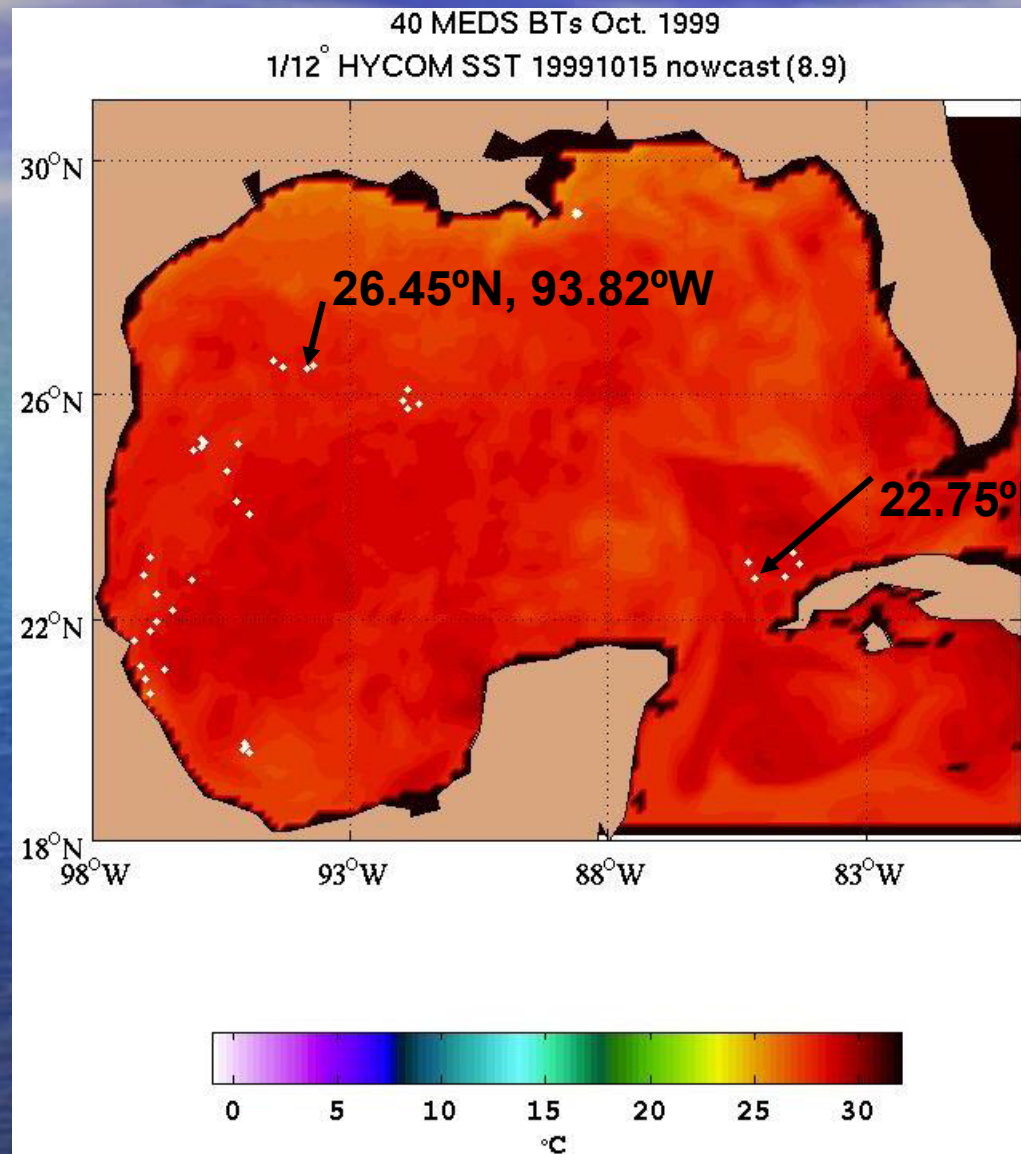


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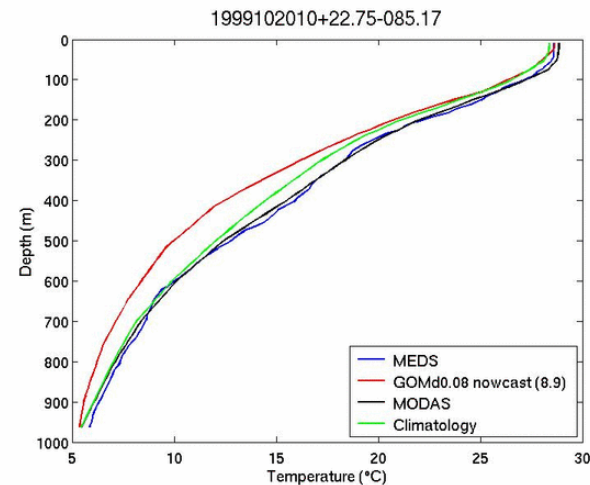
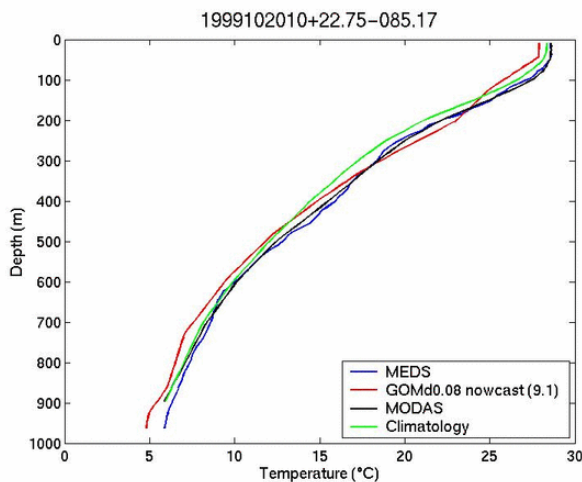
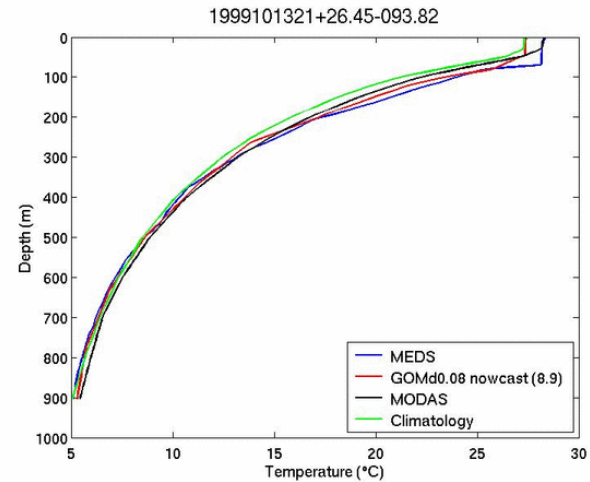
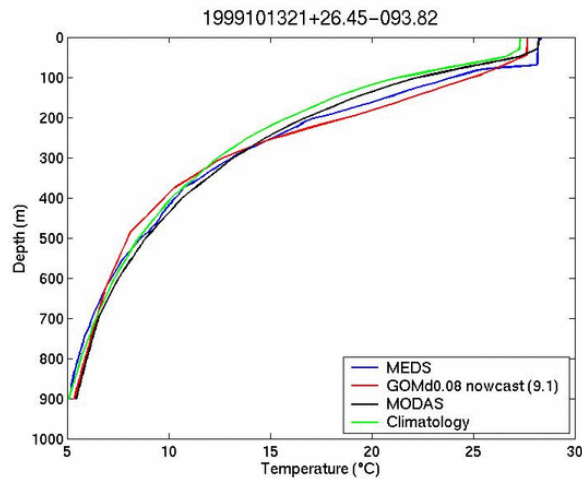
T, S and dp updating



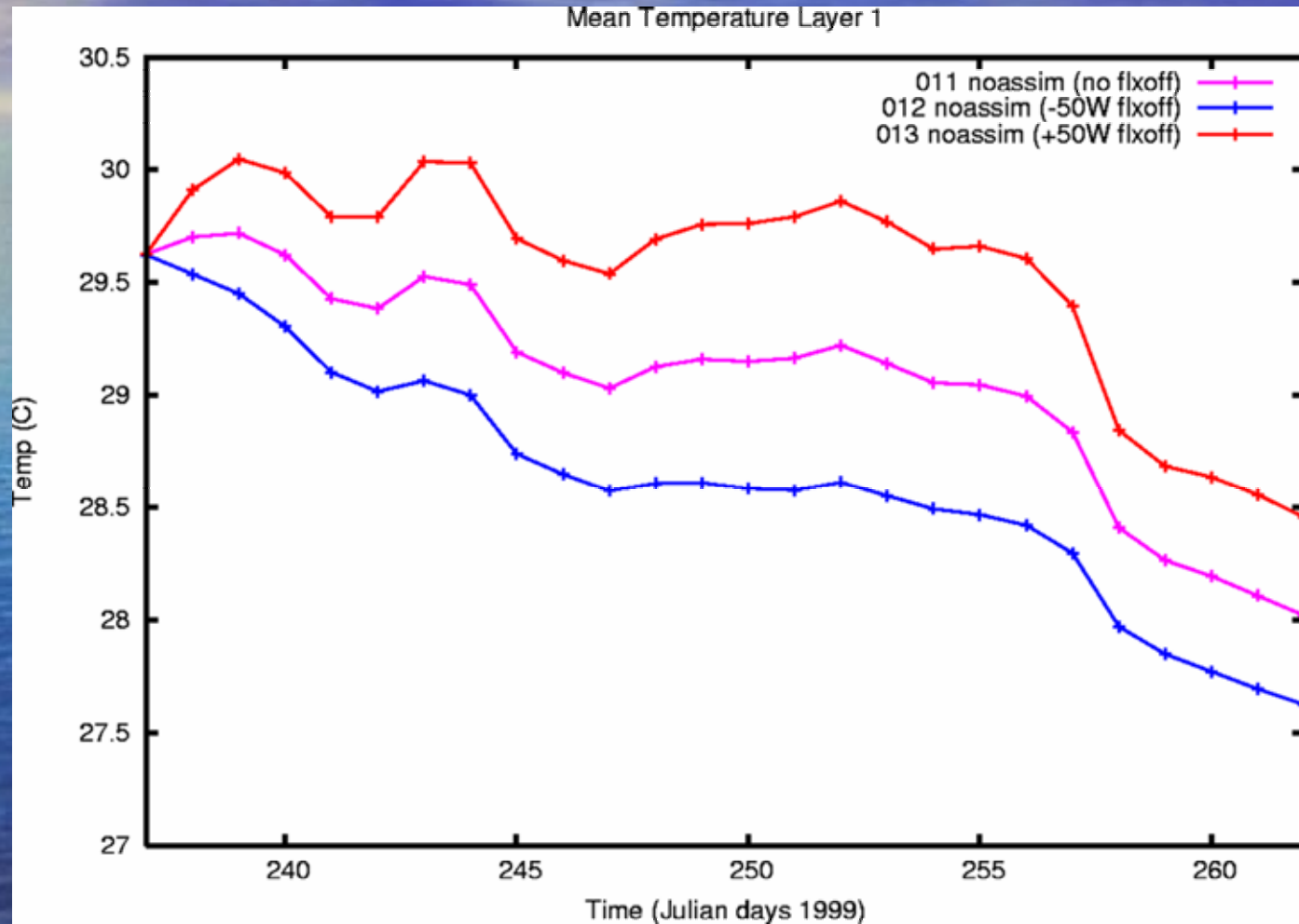
BT positions October 1999



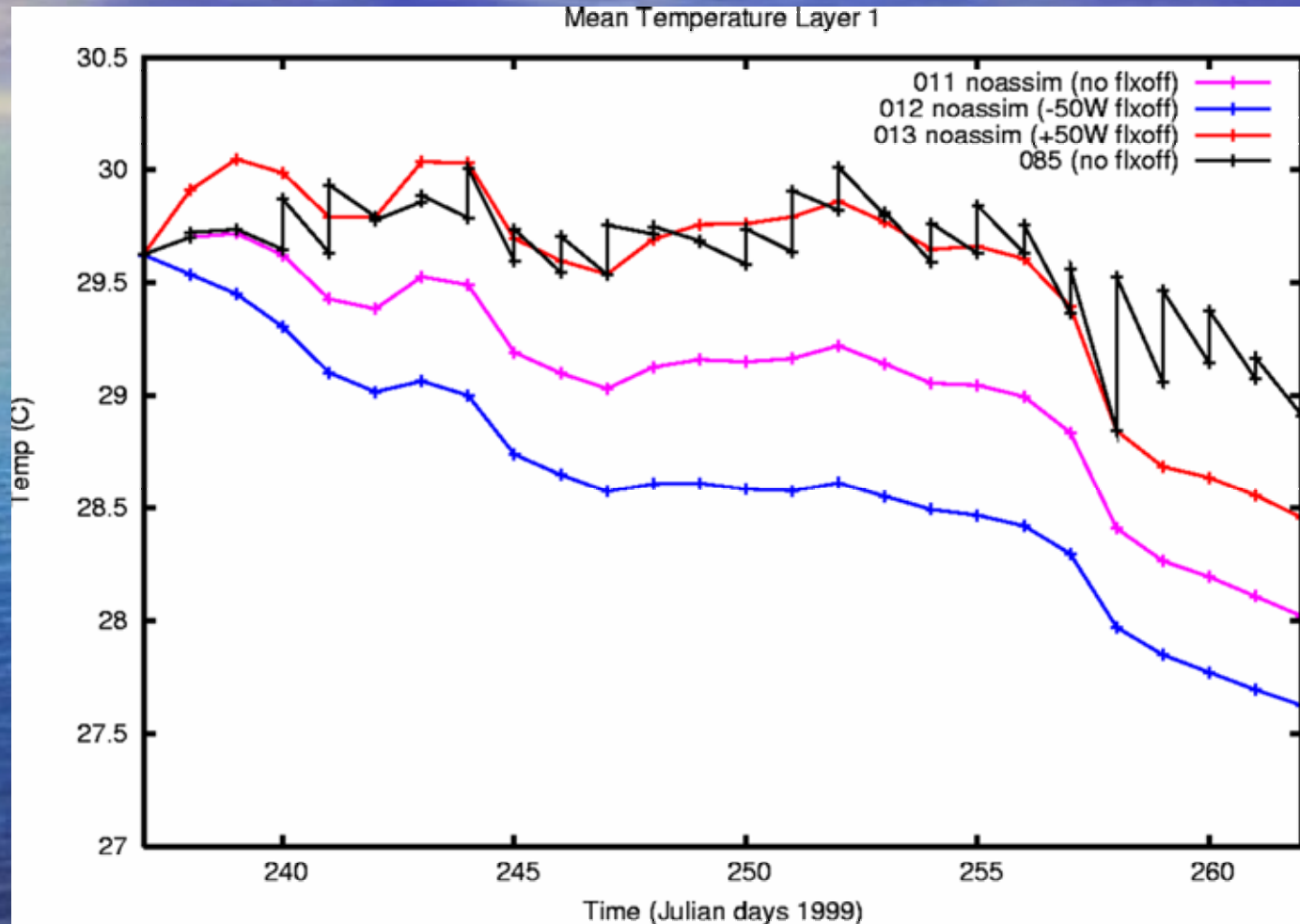
BT comparison October 1999



Mean Temperature Layer 1

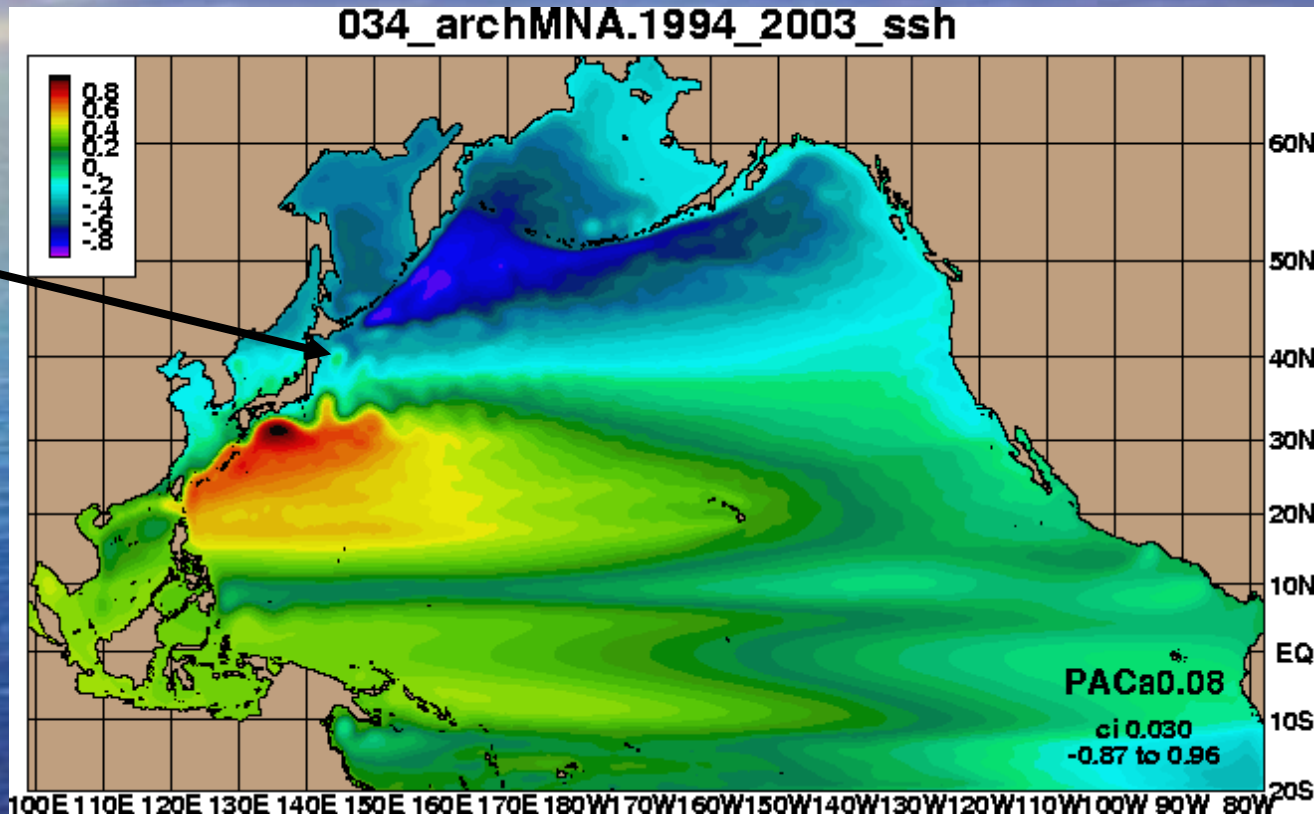


Mean Temperature Layer 1



1/12° PACIFIC HYCOM

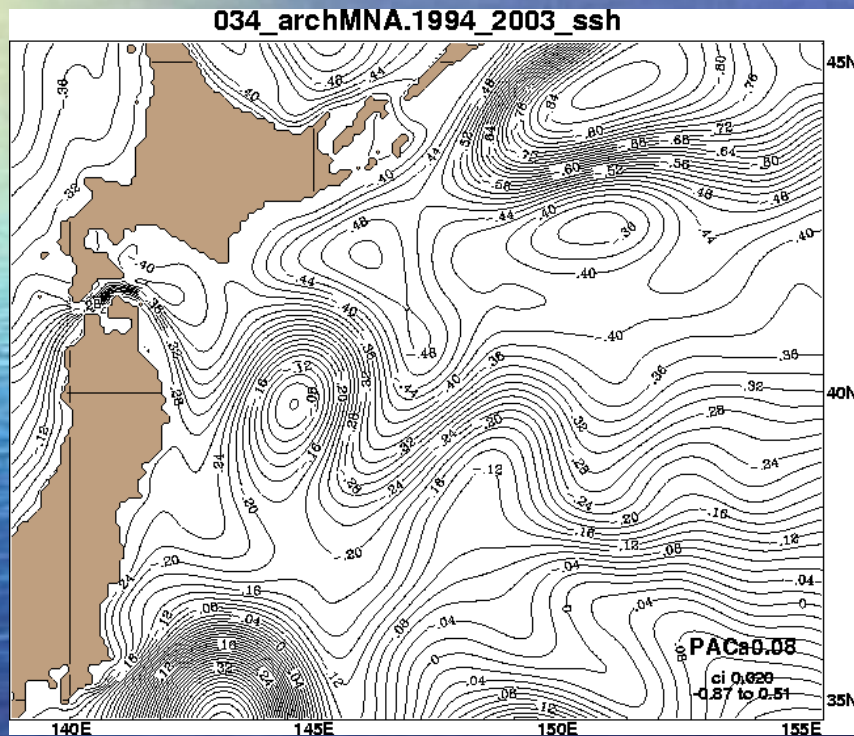
Mean SSH 1994 – 2003



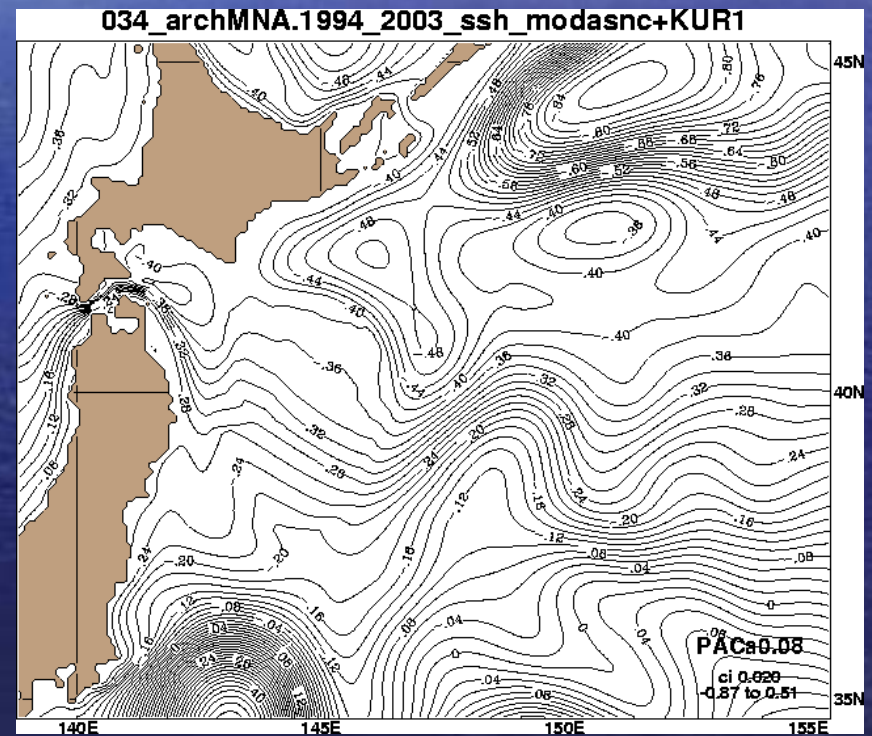
1/12° PACIFIC HYCOM

Mean SSH 1994 – 2003

ORIGINAL



RUBBER SHEETED



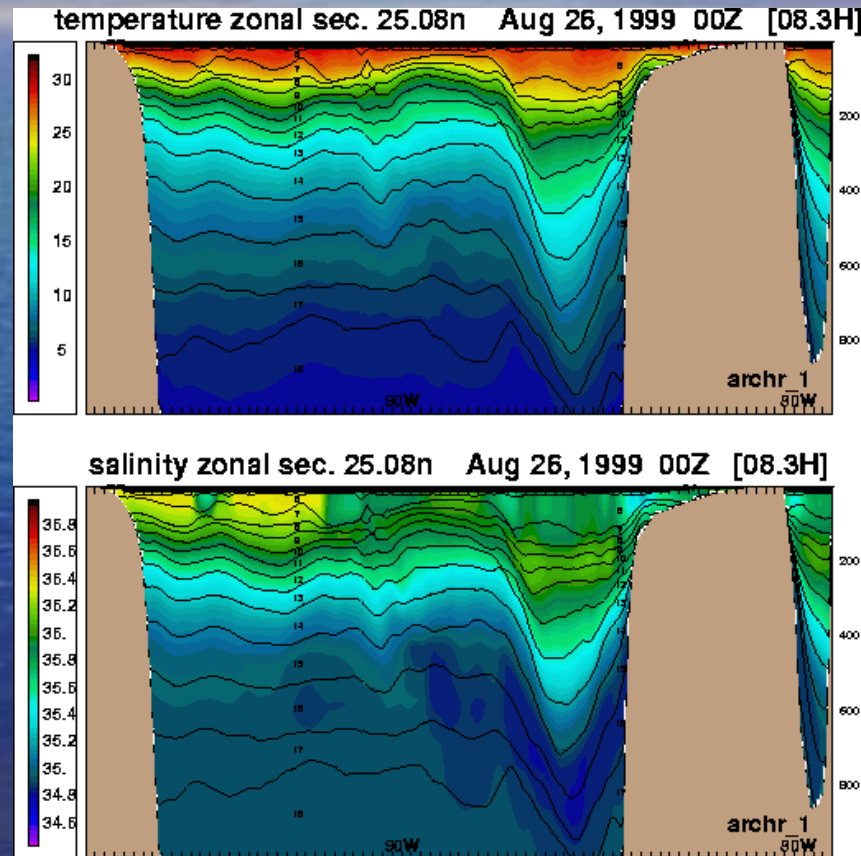
Future

- NCODA in 1/12° Pacific HYCOM
- NCODA in 1/12° Atlantic HYCOM
- 1/12° Global HYCOM assimilation

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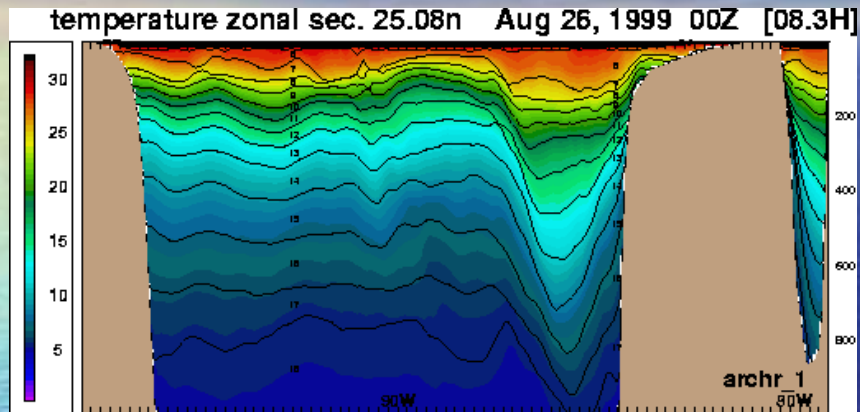
T and S section along 25.08°N, 31 August 1999

T and S updating

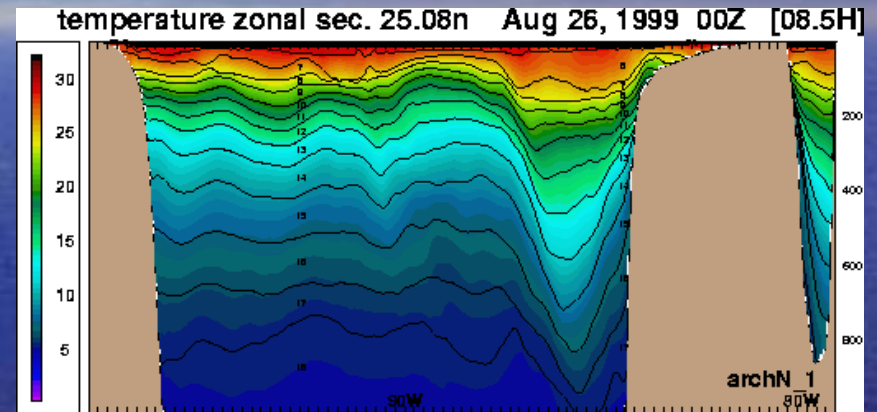


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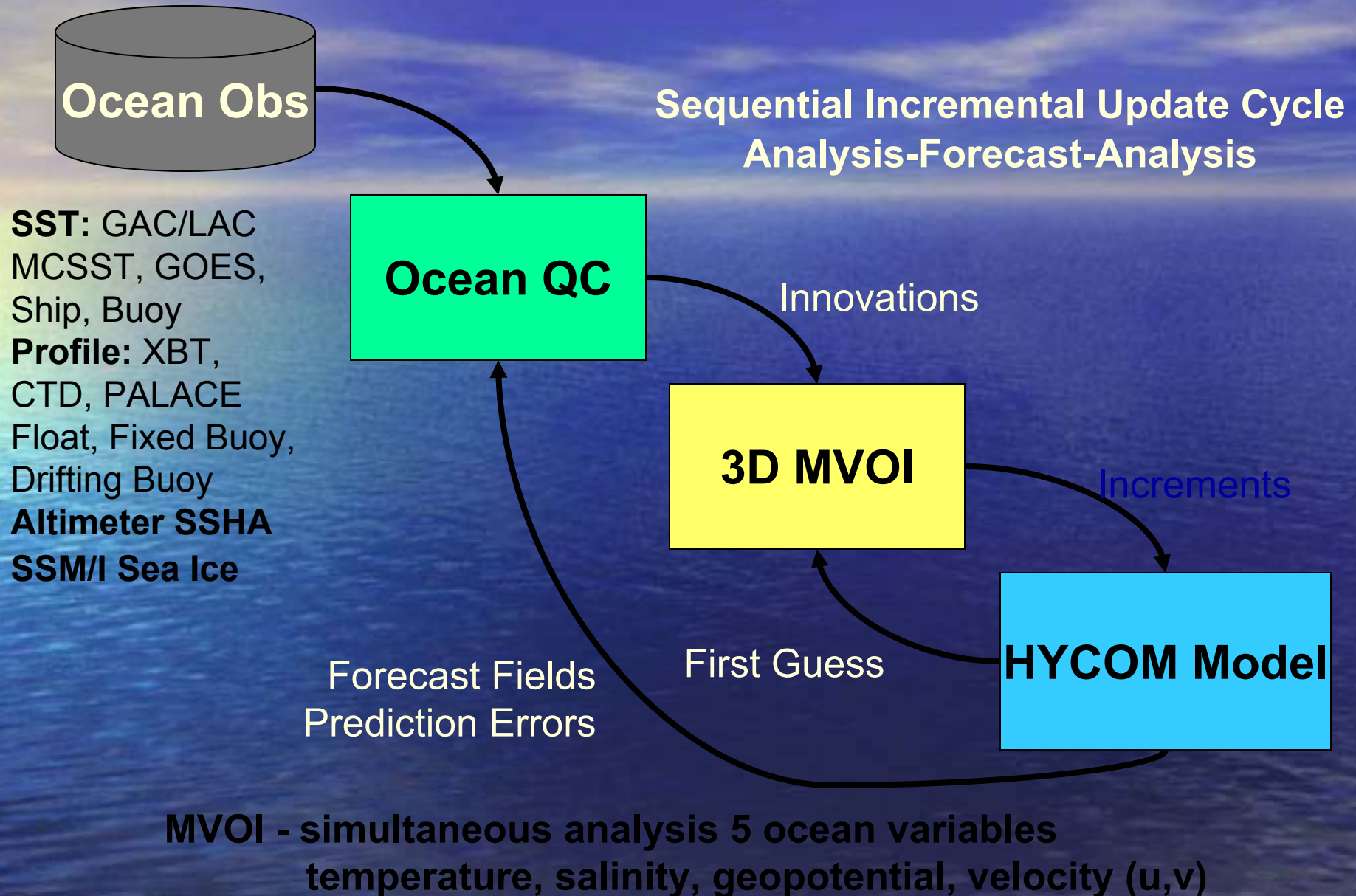
T and S updating



T, S and dp updating

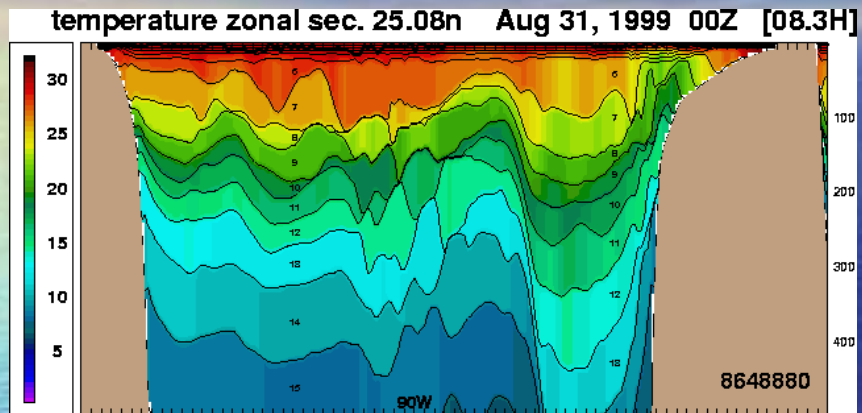


NRL Coupled Ocean Data Assimilation (NCODA)

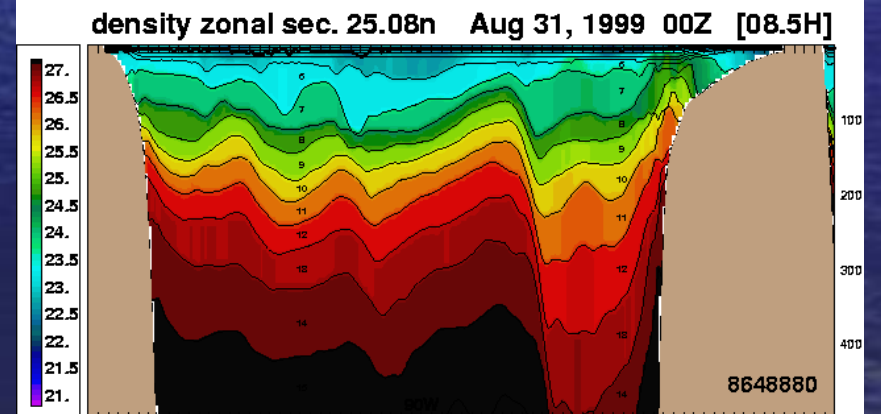
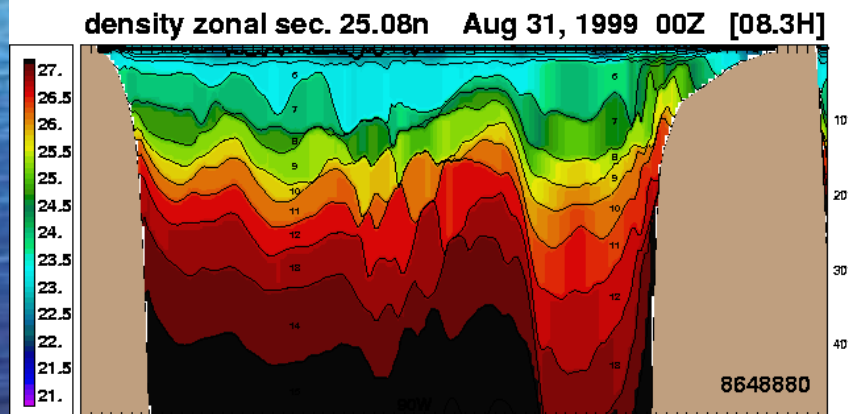
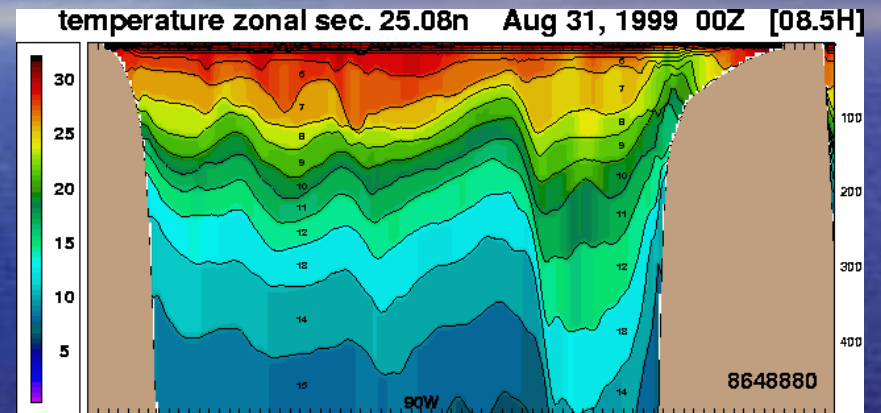


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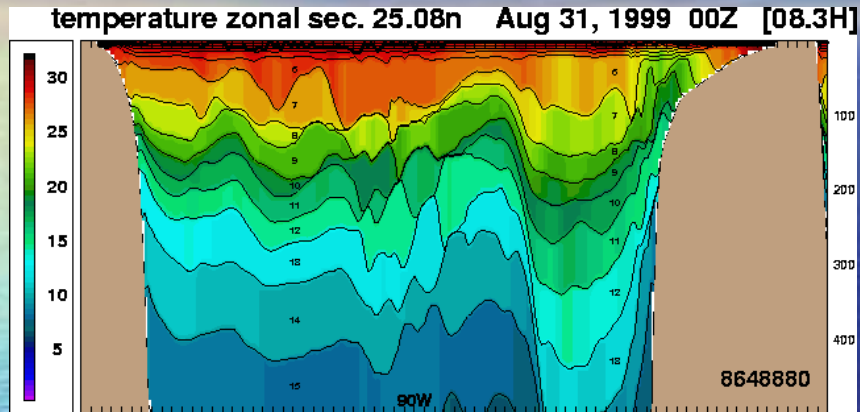


T, S and dp updating



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T and S updating



T and S updating, new hybgen

