HYCOM Meeting, October 2004

U.S. GODAE: Global Ocean Prediction with the Hybrid Coordinate Ocean Model (HYCOM)

Community Effort: NRL, U. of Miami, Los Alamos, NOAA/NCEP, NOAA/AOML, NOAA/PMEL, PSI, FNMOC, NAVOCEANO, SHOM, LEGI, OPeNDAP, UNC, Rutgers, USF, Fugro-GEOS, Orbimage, Shell, ExxonMobil, ROFFS

Objectives and Goals

- A broad partnership of institutions that will collaborate in developing and demonstrating the performance and application of eddy-resolving, real-time global and basin-scale ocean prediction systems using HYCOM
- To be transitioned for operational use by the U.S. Navy at NAVOCEANO and FNMOC and by NOAA at NCEP

Data Assimilation

- Several techniques are either in place or under development; they vary in sophistication and computational requirements. Adjoint under development (linear tangent done).
- MvOI as well as the SEEK (Single Evolutive Extended Kalman) filter and ROIF (Reduced Order Information Filter) are being evaluated. MvOI should be in place this fall. The SEEK filter has been implemented in the 1/3º Atlantic configuration and is presently being evaluated in the 1/12º configuration.

Roadmap

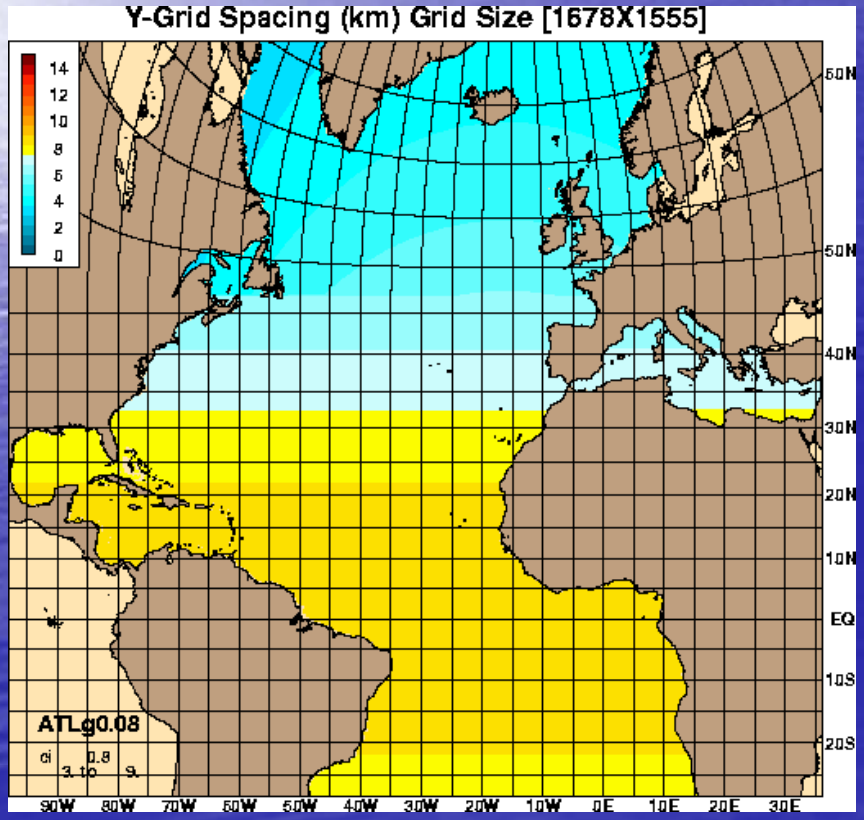
- Basin-scale
  - FY04 to FY07: Improvements in the present near real time NRL/Miami 1/12º North Atlantic configuration. Evaluation of MvOI and the SEEK and ROIF filters. Overlap in FY07 with the global configuration for assessment of the global system in the Atlantic.
  - FY05 to FY07: Implementation of a 1/12º North Pacific forecasting system (OI to start with, then more sophisticated techniques).
  - NCEP Atlantic configuration will become operational in FY06 and Pacific configuration in year FY08.

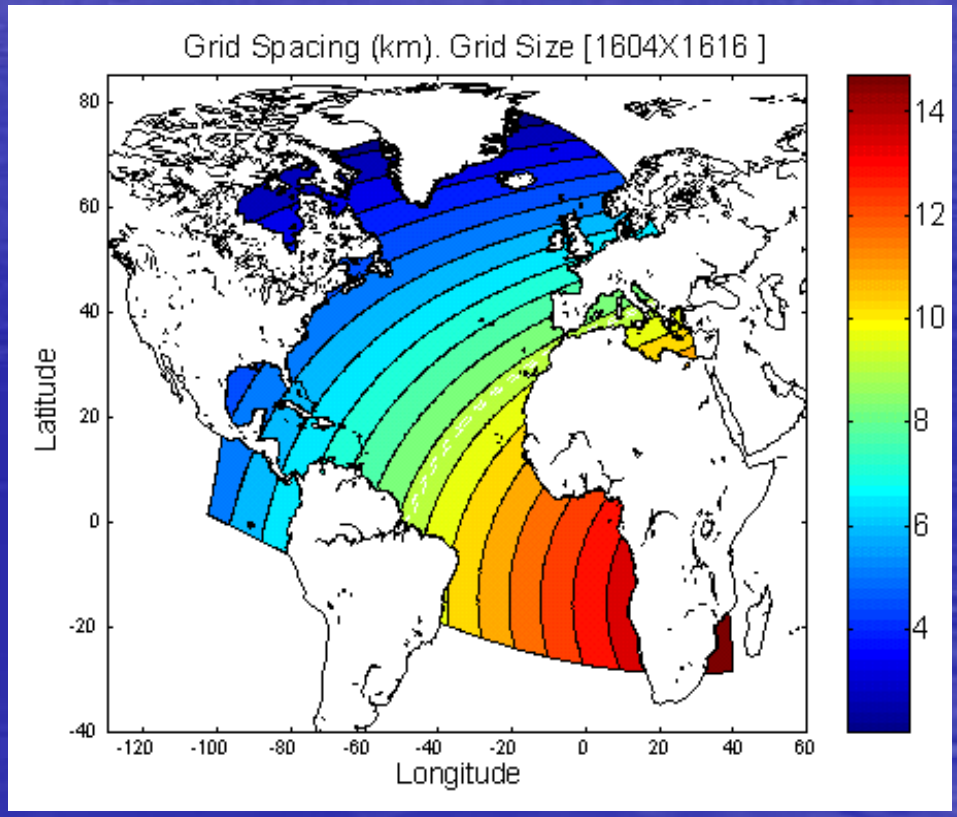
Roadmap

- Global configuration
  - Development will take place in FY04 to FY06. At the present, evaluation of thermobaricity and coupling to the Los Alamos CICE sea-ice model.
  - Transition to NAVOCEANO (1/12º) and FNMOC (1/4º) with MvOI end of 2006.
  - Operational testing in FY07-FY08

Configuration of the Prediction Systems

- Basin-scale (NRL/Miami and NOAA)





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)
  - . Relaxation to the MODAS SST analysis
- Automated scripts to run the system from the preprocessing of the forcing fields to the post processing of the results

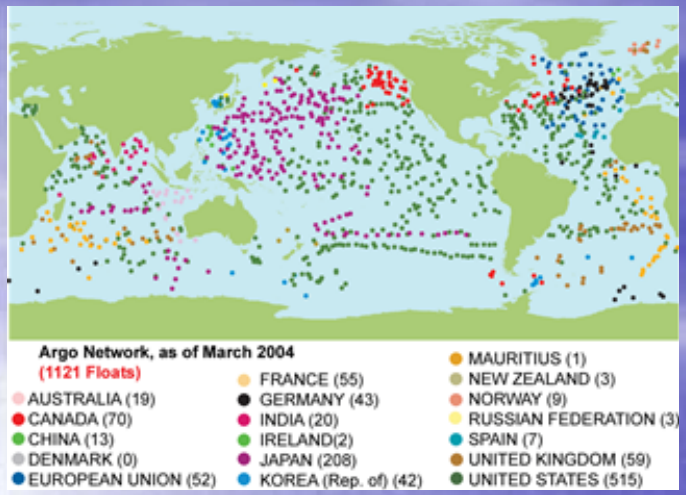
http://hycom.rsmas.miami.edu

Comparison to vertical profiles

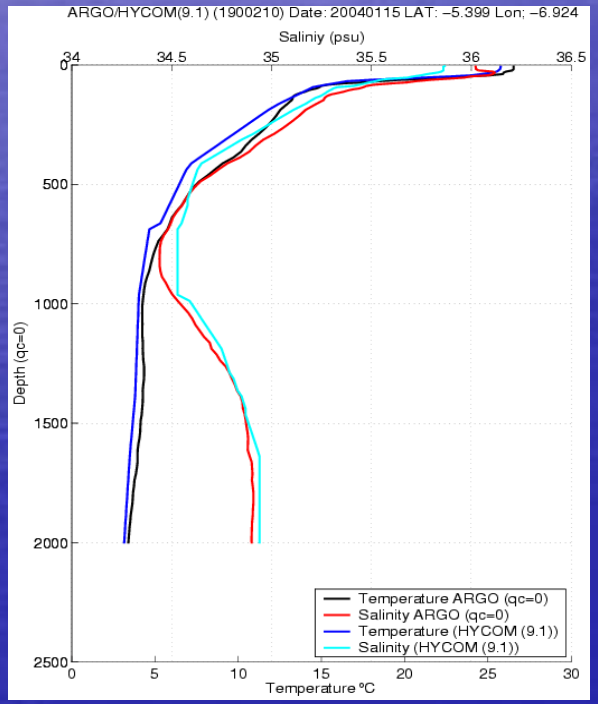
- ARGO profiles (T(z) & S(z)) (weekly)
- PIRATA buoys (weekly)
- MEDS data (monthly)
- Statistics in different regions of the Atlantic domain

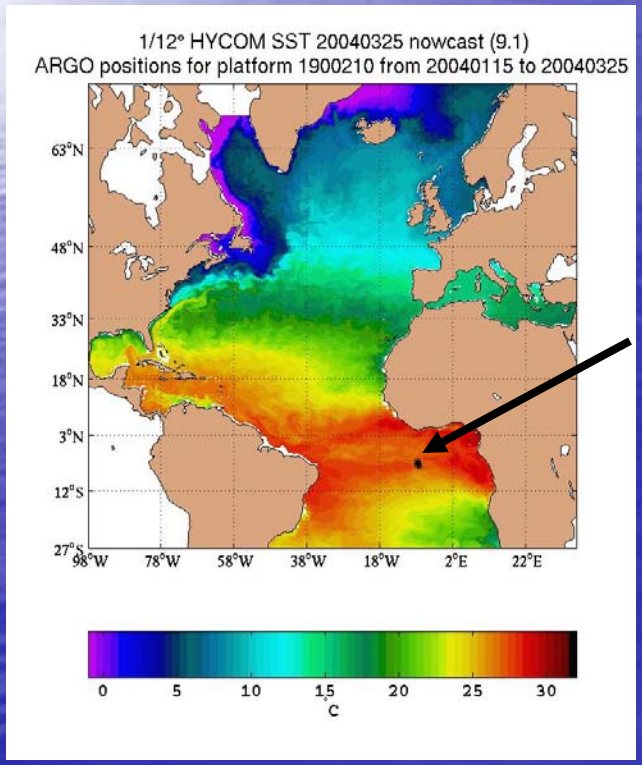
ARGO profiles

http://w3.jcommops.org/cgi-bin/WebObjects/Argo

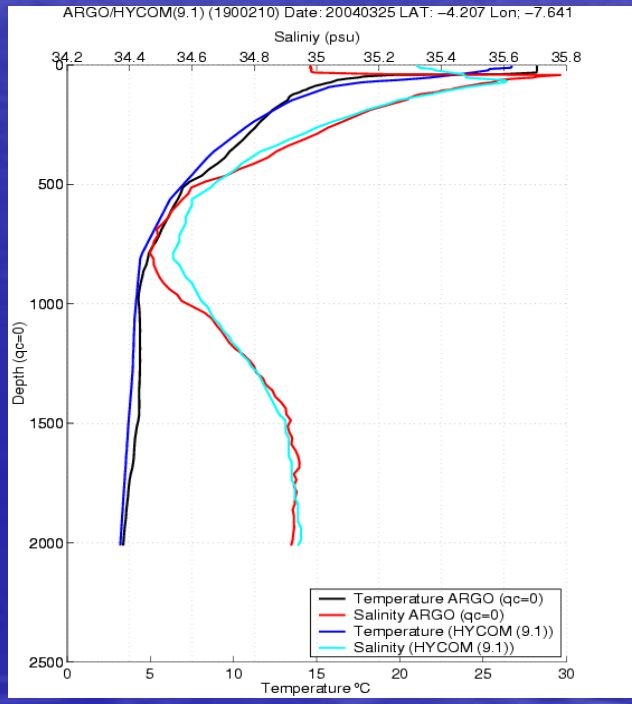


15 January 2004
5.399°S, 6.924°W

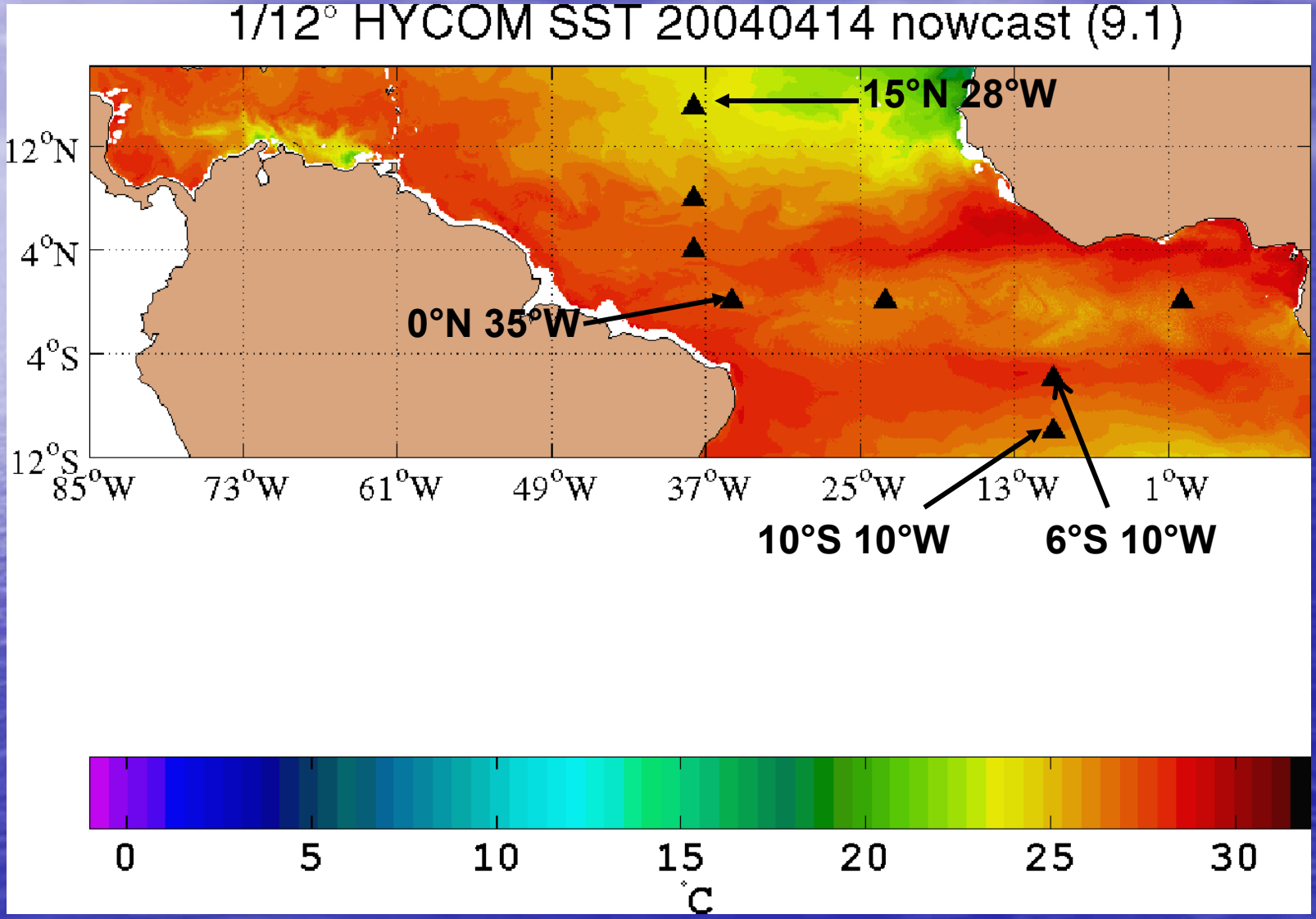




25 March 2004
4.207°S, 7.641°W

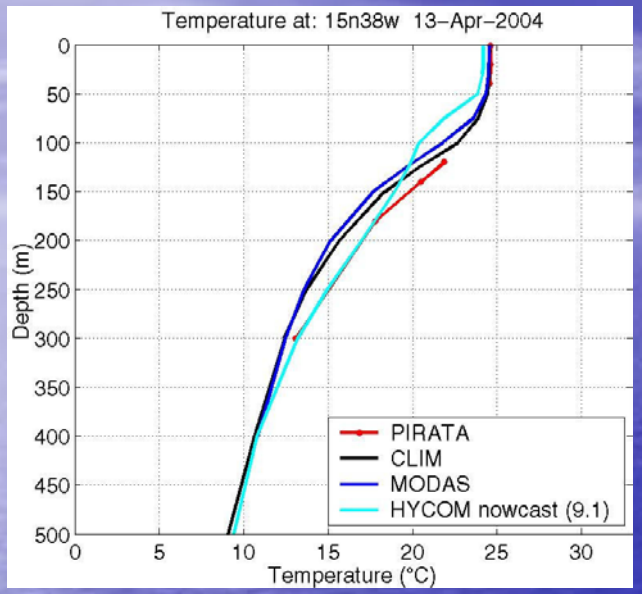


POSITIONS OF PIRATA BUOYS

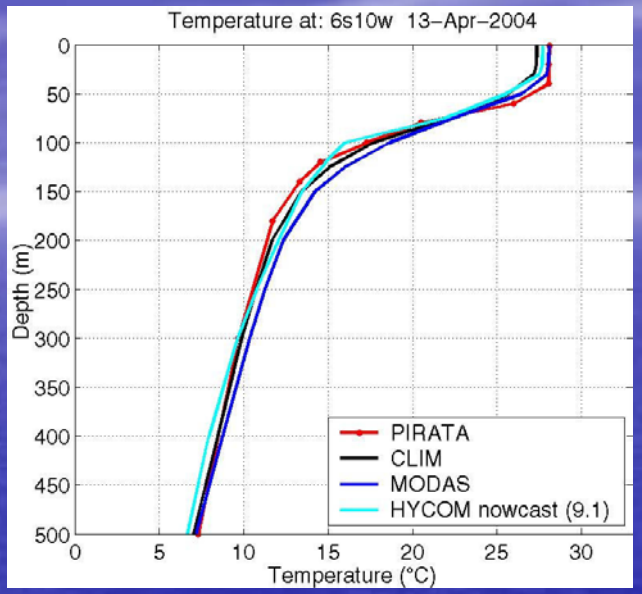


PIRATA BUOYS 13 April 2004

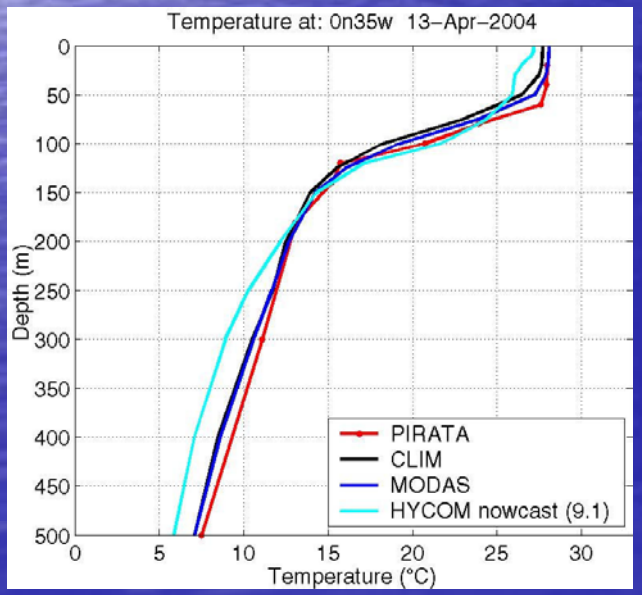
15°N 28°W



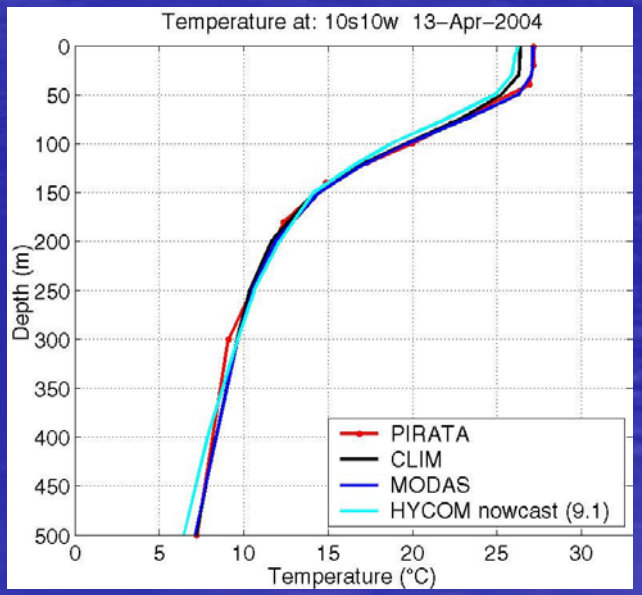
6°S 10°W



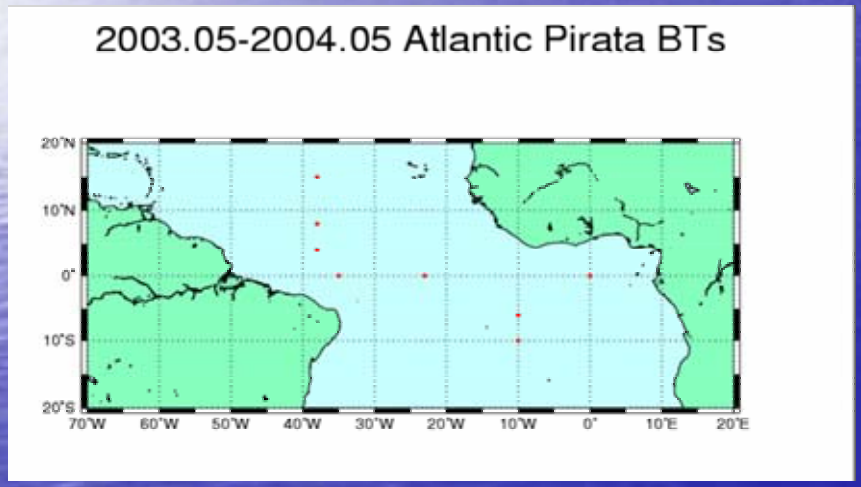
0°N 35°W

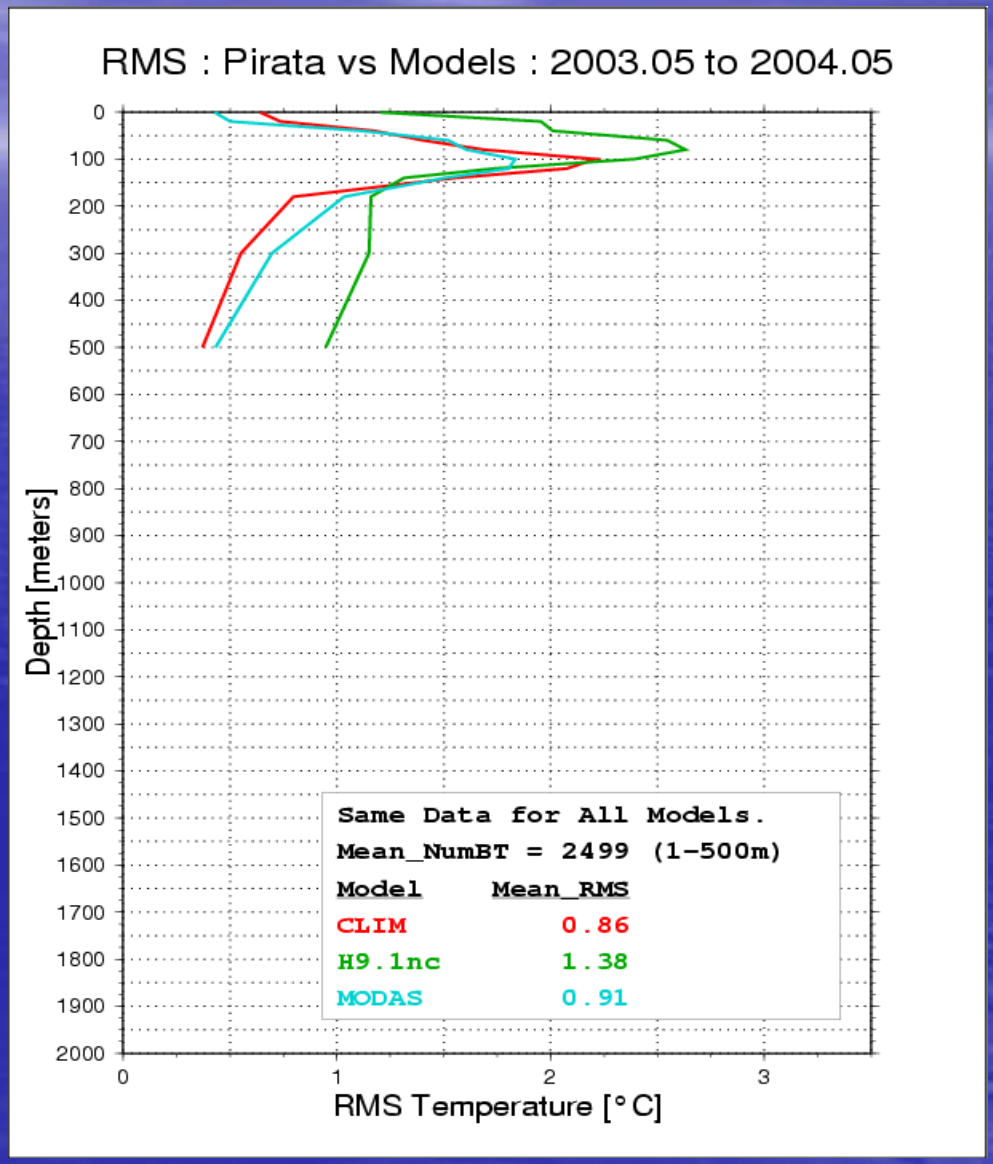


10°N 10°W

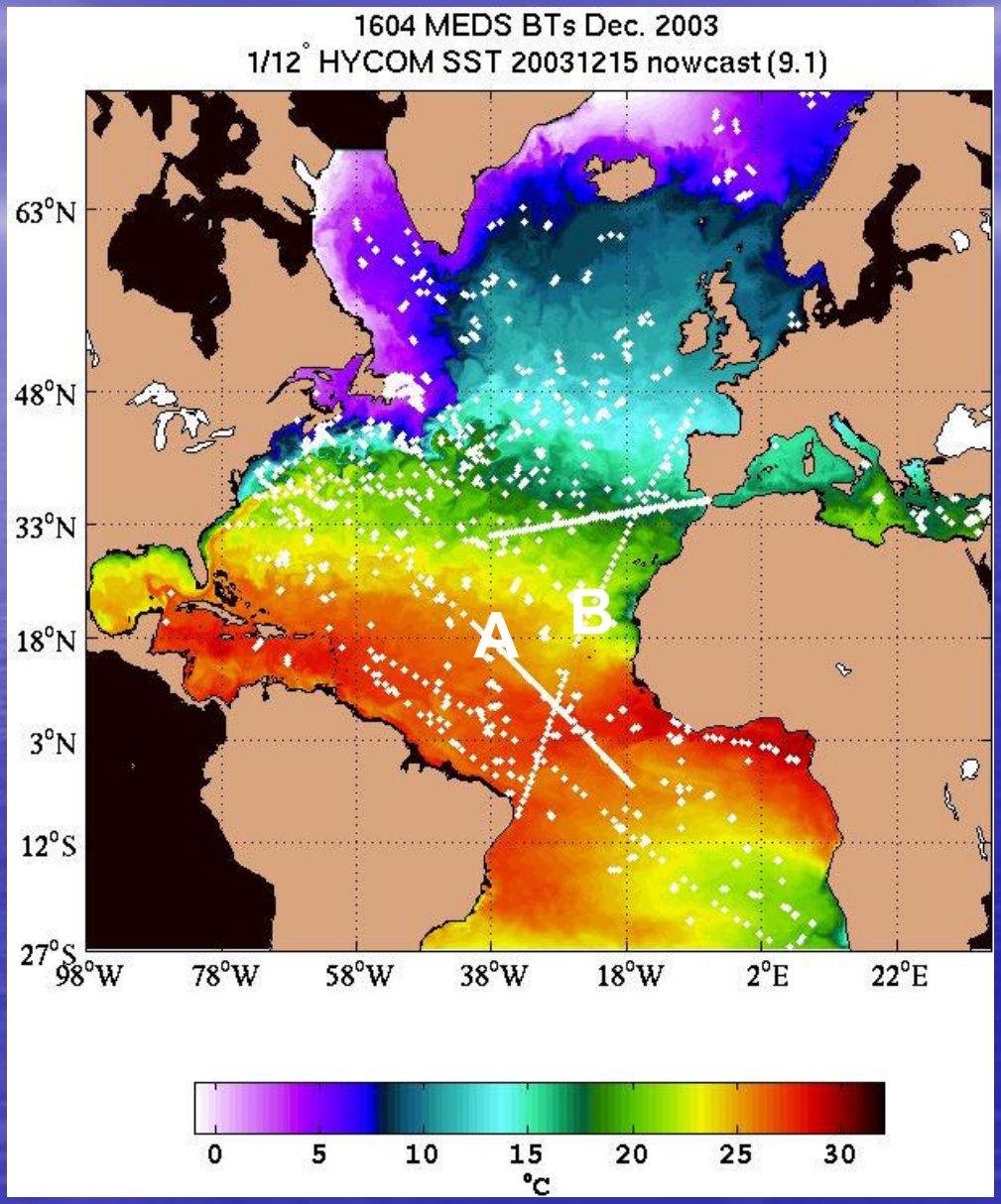


Statistics of PIRATA profiles
May 2003 – May 2004

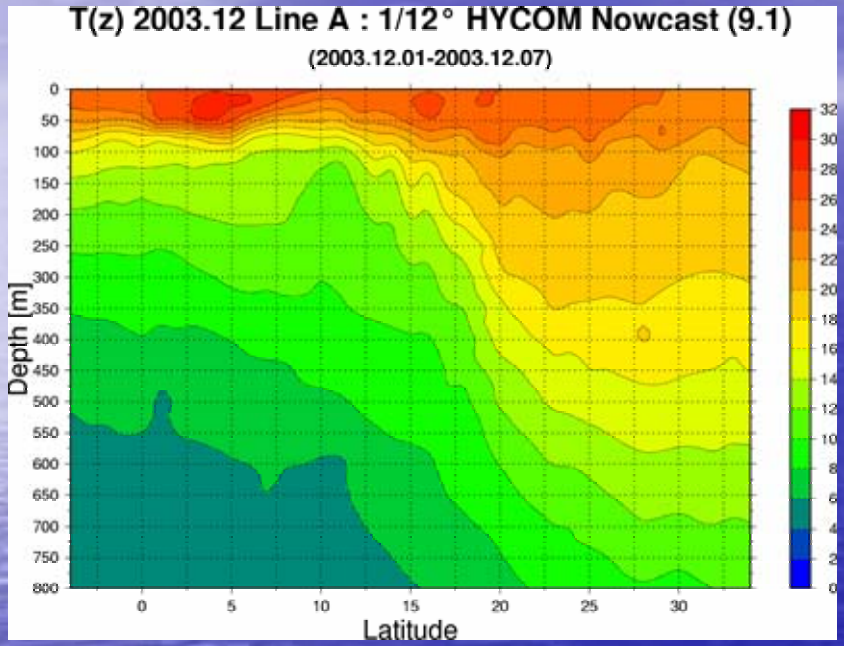


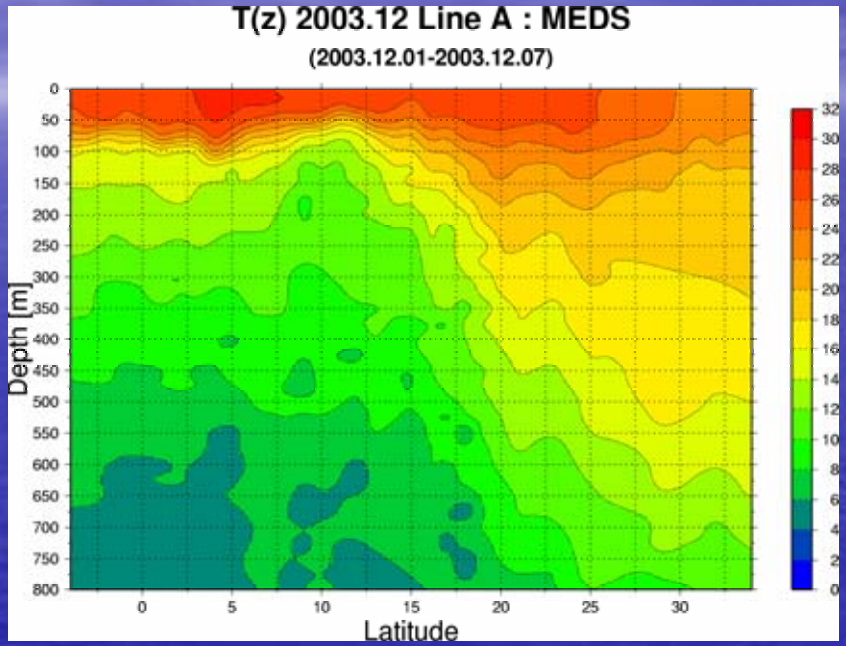


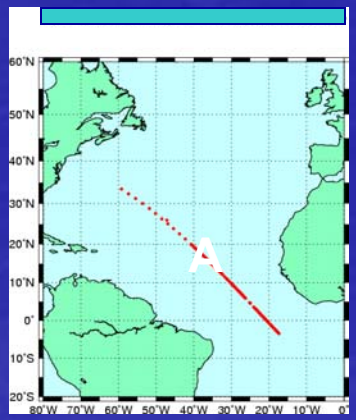
MEDS BT positions December 2003



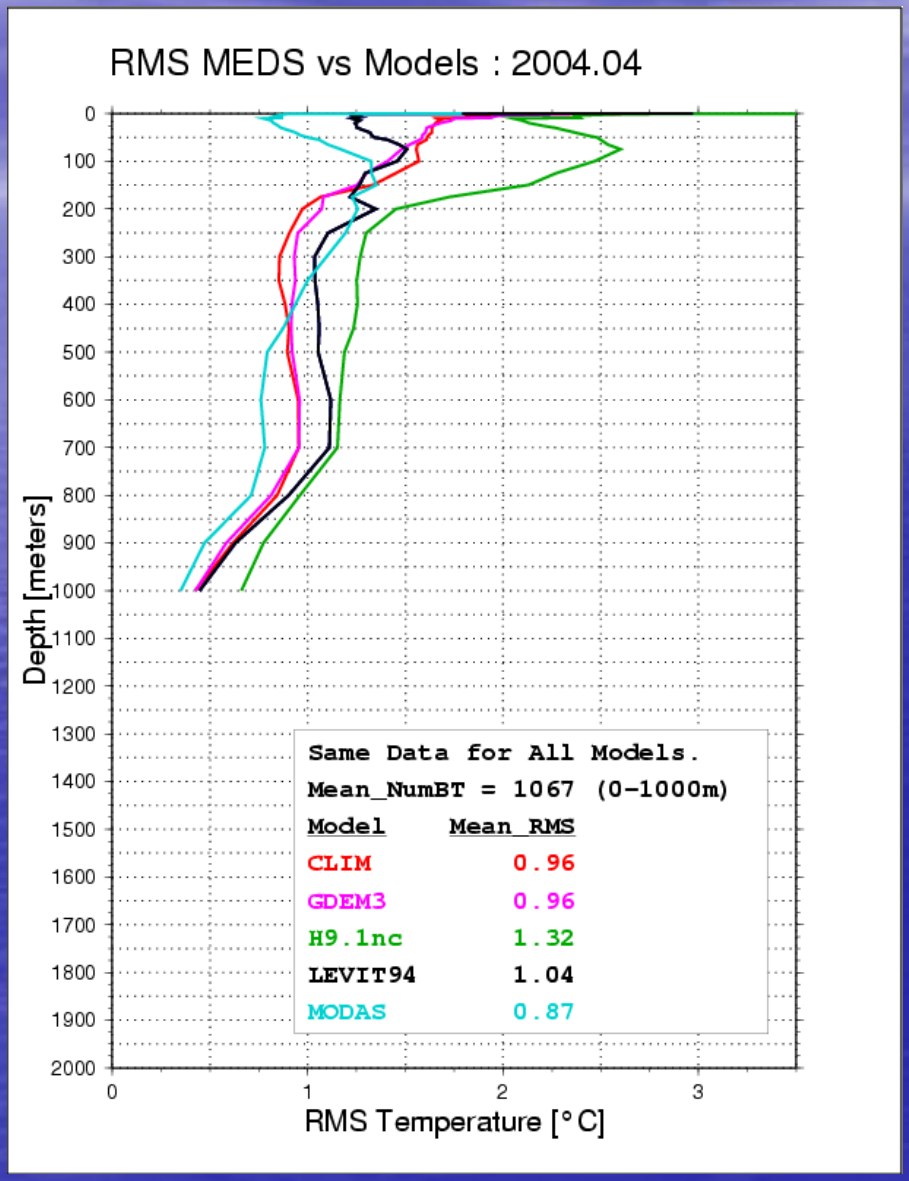
MEDS BT sections







Profile BTs statistics April 2004



Model Outputs

- Are available to the community at large within 24 hours via ftp and the Miami Live Access Server (LAS)
- Strong collaboration with NOAA/PMEL (S. Hankin) and OPeNDAP (P. Cornillon) to enhance the LAS and to provide an efficient distribution of the model outputs
- Comparison with other GODAE products (i.e. MERSEA collaboration)

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