NOAA Ocean Prediction Center: HYCOM Evaluation Status

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Who are we?

- NOAA National Weather Service (NWS)
  
  - National Centers for Environmental Prediction (NCEP)
  
  - Ocean Prediction Center (OPC)
Why do we need Hycom?

Need to Improve Forecasting of:

- Waves, Currents and effects of the Wind
- Significant ocean features like Eddies, and Upwelling zones
- Location of the Gulf Stream
- Particle transport (Pollutants, Search and Rescue)
RT_OFS_ATL Evaluation

- OPC evaluation of the Real Time Ocean Forecast System (RT_OFS_ATL) = HYCOM for NCEP and the National Centers Advanced Weather Interactive Processing System (N-AWIPS = software)

  - Case studies
    - RT_OFS_ATL vs. GOES SST
      - Gulf Stream
    - RT_OFS_ATL vs. ROFS
      - SST
      - Currents
    - Gulf of Maine
RT_OFS_ATL vs. GOES SST

Hycom 28°C contour

8/7/2005
RT_OFS_ATL vs. GOES SST

Hycom 27° C contour

8/7/2005
RT_OFS_ATL vs. GOES SST

Goes SST with Hycom contours

Gulf Stream Overshoot
RT_OFS_ATL vs. GOES SST

Hycom 22° C contour

11/16/2005
RT_OFS_ATL vs. GOES SST

Hycom 19°C contour

11/16/2005
RT_OFS_ATL vs. GOES SST

Hycom 18°C contour

11/16/2005
RT_OFS_ATL vs. ROFS

RT_OFS_ATL (HYCOM) vs. GOES SST vs. ROFS

- RT_OFS_ATL Nov 28, 2005 00 hr
- GOES SST Nov 28, 2005 0000 UTC
- ROFS Nov 28, 2005 00 hr

- RT_OFS_ATL Nov 28, 2005 24 hr
- GOES SST Nov 28, 2005 0000 UTC
- ROFS Nov 28, 2005 24 hr

- RT_OFS_ATL Nov 28, 2005 48 hr
- GOES SST Nov 28, 2005 0000 UTC
- ROFS Nov 28, 2005 48 hr
RT_OFS_ATL vs. ROFS

ROFS 051129/00000024 ROFS Surface Temperature (C)
RT_OFS_ATL vs. ROFS

HYCOM
Currents

48 hr RT OFS Sfc Current
VT Nov 28, 2005 0000 UTC

Labrador Current
RT_OFS_ATL vs. ROFS

48 hr ROFS Sfc Current
VT 0000 UTC Nov 28, 2005

ROFS Currents

ROFS 051128/00000048 ROFS Surface Currents (KTs)
Case: Gulf of Maine

August 3, 2005 – OPC Surface Analysis and HYCOM SST and Current Analysis (F000)

HYCOM: Model SST (deg C) and Current (knots) 050803/0000V000

SW Wind

E/NE Current Offshore Flow Upwelling?

degrees C
Case: Gulf of Maine

August 4, 2005 – OPC Surface Analysis and HYCOM SST and Current Forecast (F024)

NW Wind
Frontal Passage

SSW Flow
Case: Gulf of Maine

August 5, 2005 – OPC Surface Analysis and HYCOM SST and Current Forecast (F048)
Case: Gulf of Maine

August 6, 2005 – OPC Surface Analysis and HYCOM SST and Current Forecast (F072)

[Map showing wind and current patterns with labels: WSW GFS Winds and SE Current Offshore Flow Upwelling?]

degrees C
Conclusions

- HYCOM initial state doesn’t depict all of the significant features in GOES SST
  - Data Assimilation is evolving
- HYCOM overshoots the Gulf Stream north of Cape Hatteras
- Ocean features in Hycom are more stable over time than in ROFS
- Hycom predicts more realistic currents than ROFS
- Hycom will help improve the forecasting of ocean weather by the OPC
Future goals

- Implementation of RT_OFS_ATL for OPC forecasters
- Continue comparing RT_OFS_ATL with ROFS and with GOES SST
- Develop Matlab tools to evaluate the RT_OFS_ATL against GOES SST, AVHR SST, Buoy data, and other data