

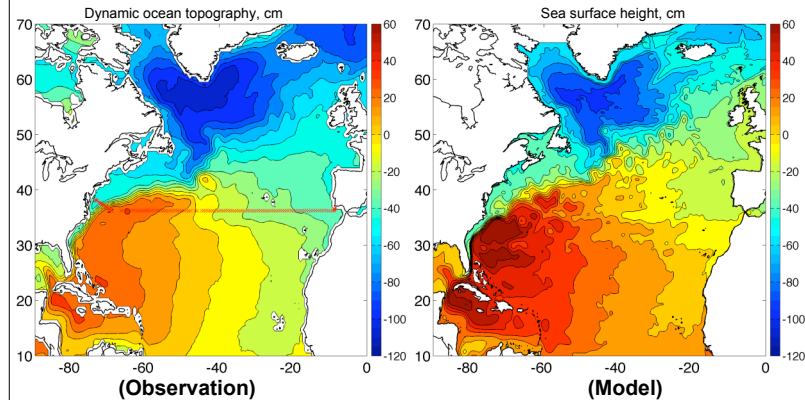
# MOW in a North Atlantic Model

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## ABSTRACT

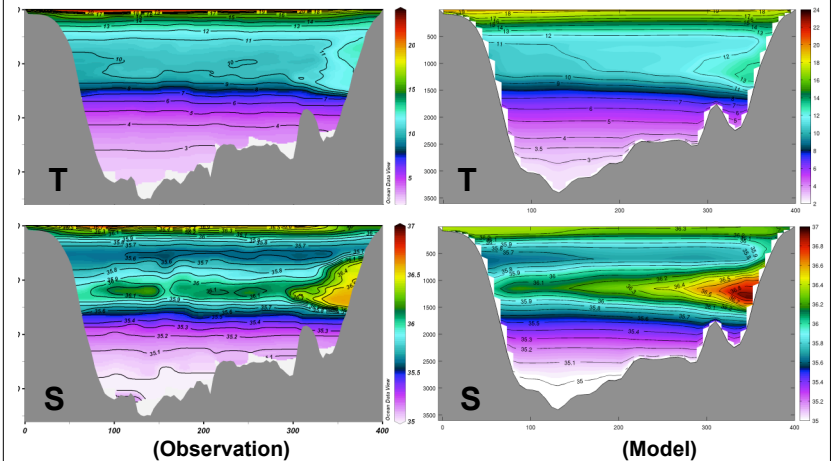
Output from a high resolution (0.08°), basin-scale (20°S-70°N) North Atlantic simulation is presented to study the circulation of the Mediterranean outflow water (MOW) in the Gulf of Cádiz and in the Northeast Atlantic Ocean. The model is based upon the hybrid coordinate ocean model (HYCOM) and includes the Richardson number-dependent entrainment parameterization of Xu et al. (2006, 2007). As observed, the simulated MOW transforms from a bottom-trapped gravity current out of the Strait of Gibraltar into a wall-bounded undercurrent at correct depth in the Gulf of Cádiz at about 8°W. Beyond the Cape of St. Vincent, MOW spreads toward west-southwest, in agreement with the general pattern shown in climatology. The entrainment of the Mediterranean outflow, as it descends down the continental slope of Gulf of Cádiz, drives the near zonal Azore current, which is visible both on the observed ocean dynamic topography and on the modeled sea surface height.

## 1. LARGE-SCALE CIRCULATION FEATURE



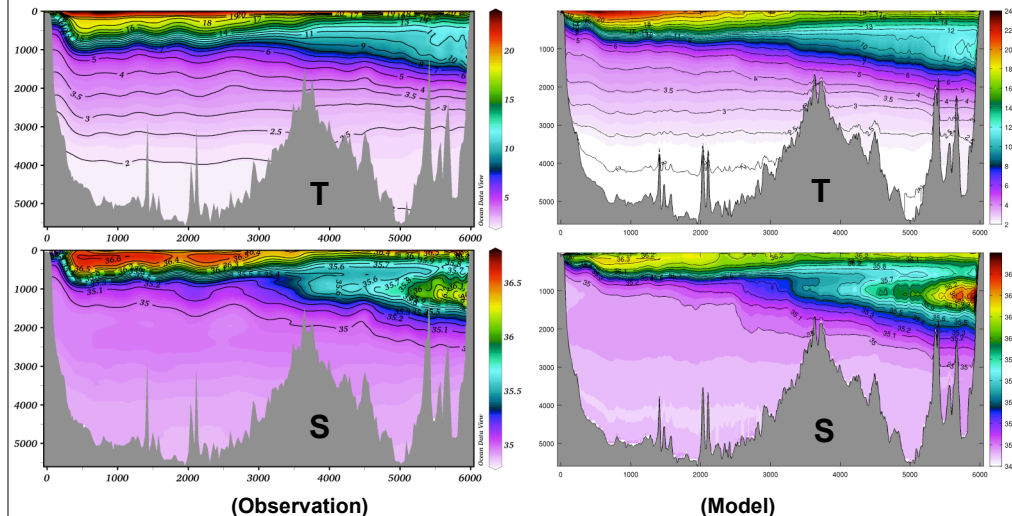
- The observed mean ocean dynamic topography (1992-2002) is calculated using jointly data of satellite altimetry, near-surface drifters, NCEP wind and GRACE (Maximenko and Niiler, 2005; Niiler et al., 2003). The red cross line indicates WOCE A03 section. The model plot is based on an annual (year 05) mean SSH. The model simulates the nearly-zonal Azore current, which is associated with MOW.

## 2. MOW WITHIN GULF OF CADIZ AT 8.5°W



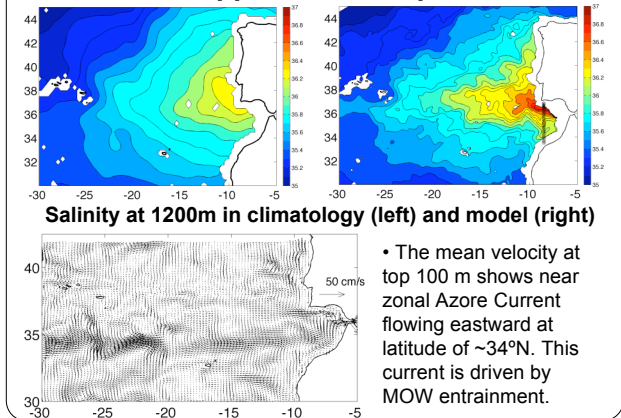
- The observation is based on two surveys (1991, 1992) across the Gulf of Cádiz at 8.5°W, the model is annual mean. The simulated MOW is equilibrated at correct depth. It is however warmer and more saline than observed.

## 3. ACROSS ATLANTIC OCEAN AT 36.3°N



- Observed potential temperature (top) and salinity (bottom) are based on WOCE A03 survey in Sep.~Oct., 1993 (location in SSH Fig.). The modeled temperature and salinity is based on one-year annual mean.

## 4. MOW and upper ocean response



- The mean velocity at top 100 m shows near zonal Azore Current flowing eastward at latitude of ~34°N. This current is driven by MOW entrainment.

### Reference

Maximenko, N.A., and P.P. Niiler, 2005: Hybrid decade-mean global sea level with mesoscale resolution. In N. Saxena (Ed.) Recent Advances in Marine Science and Technology, 2004, pp. 55-59. Honolulu: PACON International.  
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