

# **Enhanced Ocean Climate Products from NCEP**

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## **1. PROJECT SUMMARY**

The operational GODAS exists in three versions. There is a standard version that lags the current date by 14 days and a second version that is initialized by the standard GODAS and is brought forward to lag the current date by one day. This 1-day lag version of GODAS was in parallel testing at this time last year and has since then been successfully transferred to operations. A third, deep version of GODAS, also in parallel testing last year, has also become operational. The operational versions of GODAS are based on MOMv3. A version of GODAS, based on MOMv4, was a new development last year. It has been successfully incorporated with the CFS and is a part of the Coupled Forecast System Reanalysis and Reforecast (CFSRR) which is currently underway at NCEP.

## **2. ACCOMPLISHMENTS**

### **2.1. The Operational GODAS**

The standard operational GODAS assimilates observations in a window extending from 2 weeks prior to 2 weeks after the analysis date, weighting observations closer to the analysis date more heavily. The purpose of this strategy is to increase the number of observations going into the analysis, but it means that the standard GODAS analysis lags the calendar date by 14 days. To satisfy a need for a more current analysis, both for monitoring changes in the ocean state and for initializing forecasts with the CFS, there is a second operational GODAS analysis lag that is initialized by the standard analysis and then runs forward using an asymmetrical observation window. This asymmetrical analysis has been upgraded in operations to have a 1-day lag with respect to the calendar date, replacing the former 7-day lag version.

The standard GODAS assimilates observations only in the upper 750 meters which does not take full advantage of the deeper Argo profiles. So in FY08 we successfully made operational a deep version of GODAS that assimilates observations down to 2200 meters. Any change to the standard GODAS must not alter the calibration of the CFS forecasts. However, the deep GODAS is free of that constraint and the goal is to upgrade that version on a more frequent basis.

### **2.2. The MOMv4 version of GODAS**

During FY08 the new version of GODAS based on GFDL's MOMv4 was integrated with the CFS and is now part of the Coupled Forecast System Reanalysis and Reforecast (CFSRR) which is currently underway at NCEP. This version of GODAS uses the tri-

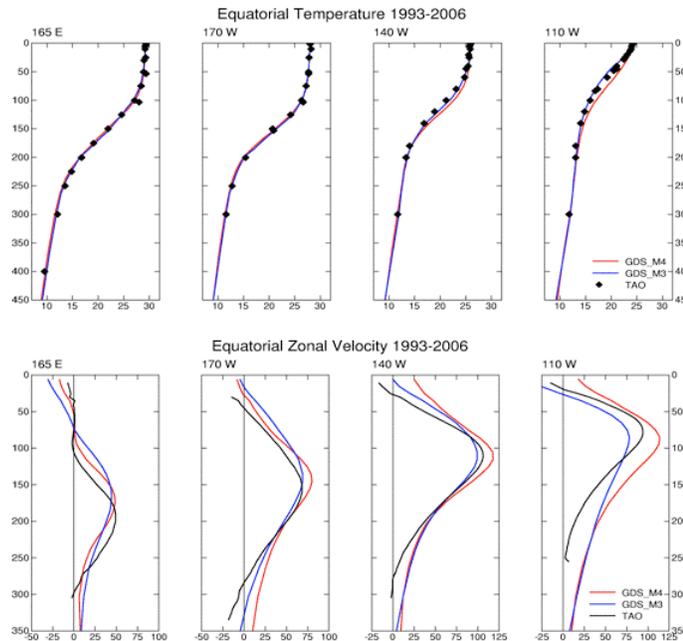
polar grid of MOMv4 and is a fully global system that includes an Arctic Ocean and an ice model.

Also during FY08 the MOMv4 GODAS was further modified to allow the choice of either assimilating surface data (e.g. the Reynolds SST OI) or relaxing to it. It is also possible with the new GODAS to assimilate the different types of observations simultaneously (as is done in current operations), to assimilate them sequentially or to choose some configuration in between. This increased flexibility will make it easier to balance the constraints imposed by different data sets and to fine tune the system.

### 3. FY08 PUBLICATION

Huang, B., Y. Xue, and D. W. Behringer, 2008. Impacts of Argo salinity in NCEP Global Ocean Data Assimilation System: The tropical Indian Ocean. *J. Geophys. Res.*, 113, C08002.

### Comparison of GODAS/M4 and GODAS/M3 with TAO temperature and zonal velocity



In the thermocline both GM4 and GM3 are warm at 140w, while GM4 is warm and GM3 is cold at 110w.

The undercurrent is stronger than observed in GM4 and weaker in GM3. The vertical structure at 165e is better in GM4 than in GM3.