

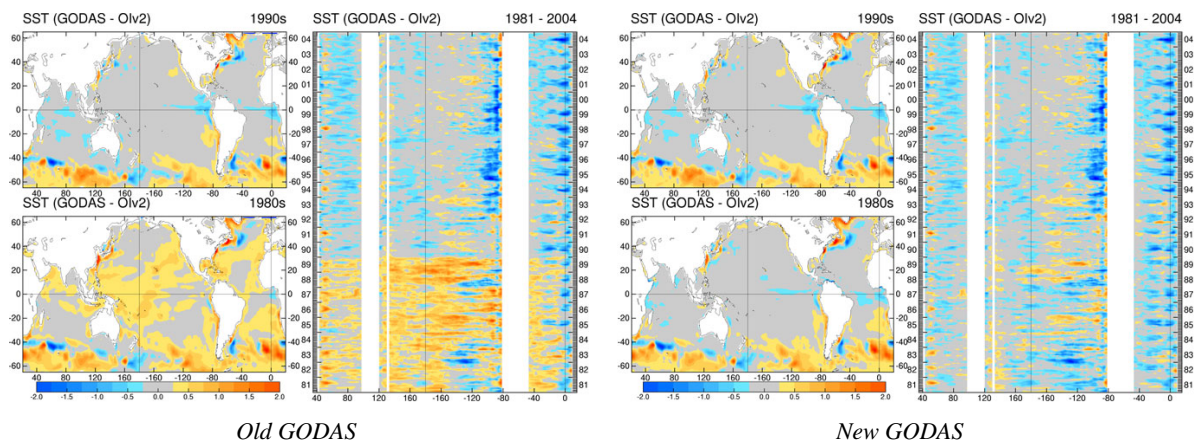
Review of Recent Changes in Global Ocean Data Assimilation System

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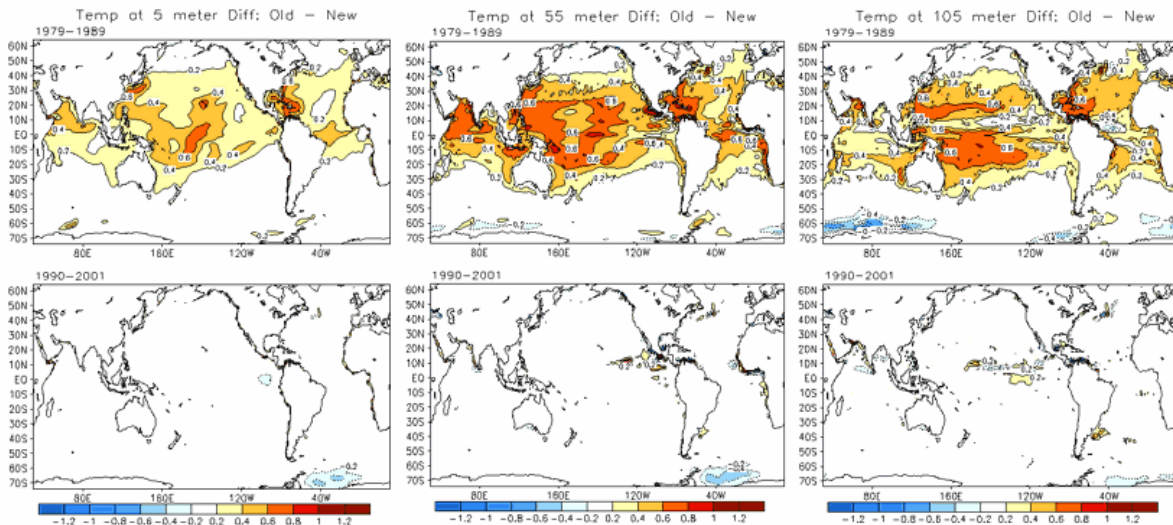
Previous studies (Peng 2005) compared the sea surface temperature (SST) produced by the Global Ocean Data Assimilation System (GODAS) to that by the Optimum Interpolation (OI) and found discontinuity of GODAS SST from 1989 to 1990. The warm bias in the earlier period was evident. Recently, an error has been identified in the pre-processing of the Expendable Bathythermograph (XBT) data for the years prior to 1990. By making the correction, a new version of GODAS data is created and available in the GODAS web site. The impact of the corrections has also been examined and illustrated in the following.

- Most of the changes are in 1979-1989 due to corrections of XBT profiles in that period.

SST Difference from OI data

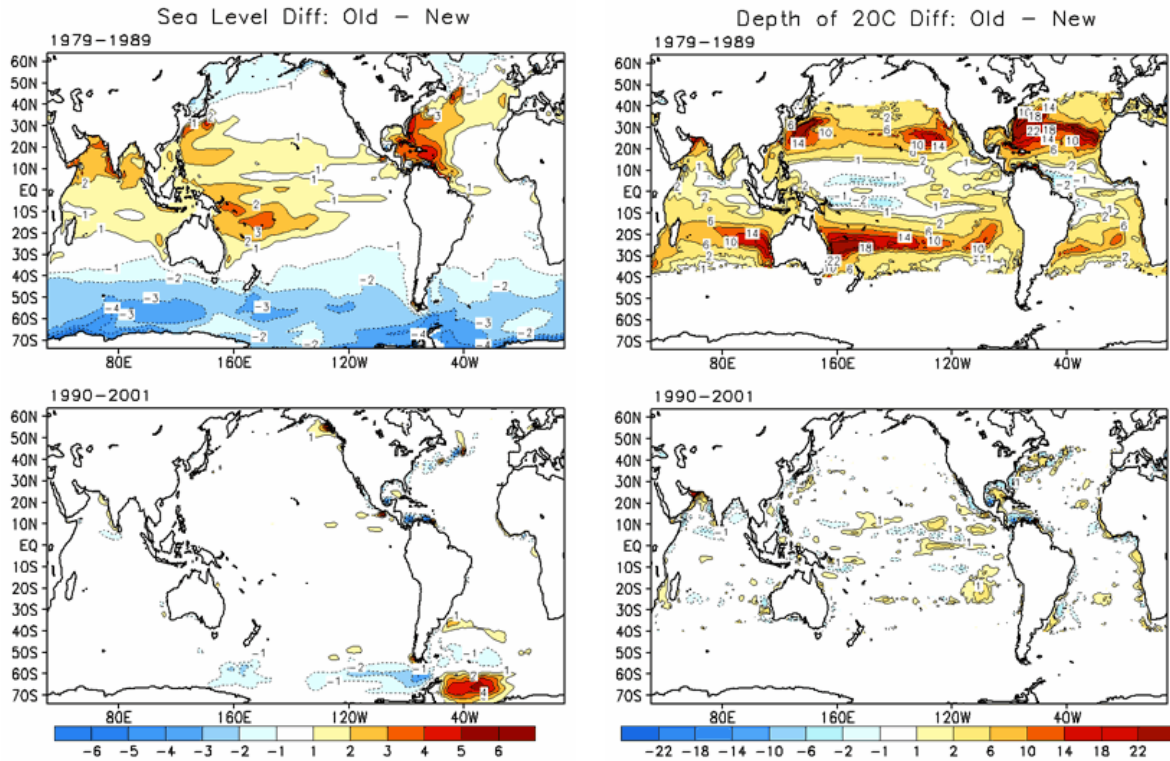


- Average reductions of temperature in 1979-1989 are about 0.5-0.6 degree, distributed approximately evenly in depth.

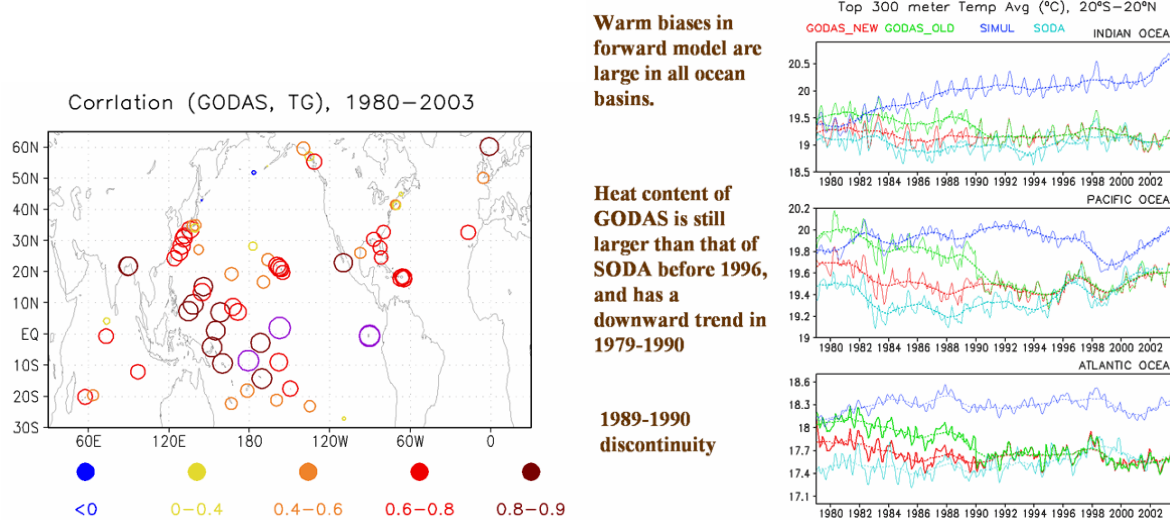


- Average reductions of sea level are 1-2 cm in tropical Indian and Pacific, and 3-4 cm in western tropical Atlantic. (See left below)

- Average reductions in depth of 20 degree are as large as 18 meter in midlatitude, but only 1-2 meter in the tropics. (See right below)



- Correlation with tide gauge observations is improved, and it is about 0.7-0.9 in tropical Pacific, and 0.4-0.7 in tropical Indian and Atlantic Oceans. (See left below)
- Although the discontinuity in 1989/1990 is largely removed, there are remaining downward trends in 1979-1990, probably due to the warm biases in forward model. (See right below)



Warm biases in forward model are large in all ocean basins.

Heat content of GODAS is still larger than that of SODA before 1996, and has a downward trend in 1979-1990

1989-1990 discontinuity

More challenges are prompted to further improvement. First, the forward model has large warm biases in all ocean basins due to errors in model forcing and physics. Second, the forward model drifts away from initial conditions in Atlantic, probably due to simulation errors of thermohaline circulation. Third, the

changes of observation network also contribute to discontinuity and trend in GODAS. To continue improving the GODAS, we are going to assimilate more observations, e.g. the Argo data, and improve the forward model as well as the ocean data assimilation scheme.

References

Peng, P., 2005: GODAS data discontinuity and impact on CFS forecast bias. *NWS/OST Science and Technology Infusion Climate Bulletin*.

http://www.nws.noaa.gov/ost/climate/STIP/CFS_news_070805.htm

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