Correcting Climate Forecast System Reanalysis (CFSR) winds for oceanographic applications

Deanna Spindler, Arun Chawla and Hendrik Tolman

The NCEP Climate Forecast System Reanalysis (CFSR) system, developed by Saha et al. in 2010 has been used to drive a 30 year wave hindcast (1979 - 2010), using the WAVEWATCH III model. The monthly wind speed associated with a percentile of occurrences was analyzed separately for the Northern and Southern hemispheres (Chawla et al., 2013), as well as compared with altimeter data. The Northern Hemisphere showed a consistent wind field for the length of the database. The Southern Hemisphere showed two clear transition points (1994/1995 and 2005/2006), particularly in the higher percentiles (strongest wind speeds), that coincide with the introduction of new data streams to the CFSR (Saha et al., 2010).

Prior to 1994 the CFSR wind speeds are consistently higher than observations in the Southern Hemisphere, leading to a significant over prediction in wave heights which has a significant impact on any long term analysis of the wave climate. Analyzing Quantile-Quantile plots of the altimeter versus the CFSR wind speeds along 5 degree latitude bands can yield a relationship according to percentiles. This may be used to correct the CFSR winds, removing the Southern Ocean bias in the strongest wind speeds. This approach is used to correct the winds prior to 1994, and study the impact they have on the wave climate using the limited altimeter data that is available for this region.

REFERENCES:

Chawla, A., Spindler D. and Tolman H. L. (2013) “Validation of a thirty year wave hindcast using the Climate Forecast System reanalysis winds”, *Ocean Modelling,* in press

Saha et al. (2010) “The NCEP climate forecast system reanalysis. *Bull. Am. Meteor. Soc*. 91, 1015–1057