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Introduction

We have worked with JCSDA (Joint Center for Satellite Data Assimilation) personnel to evaluate assimilation techniques and the forecast impact of assimilating Advanced SCATterometer (ASCAT) data into the National Center for Environmental Prediction (NCEP) Global Data Assimilation/Global Forecast System (GDAS/GFS). The impacts of assimilating the ASCAT surface wind products were assessed for two seasons by comparing the output through 168 hours of control simulations utilizing all the data types assimilated into the operational GDAS with experimental simulations using these new surface wind products. Quality control procedures required to assimilate the surface winds are discussed. Anomaly correlations (AC) of geopotential height at 1000 and 500 hPa were evaluated for the control and experiment during both seasons. The geographical distribution of forecast impact on the 10m wind field are also presented.

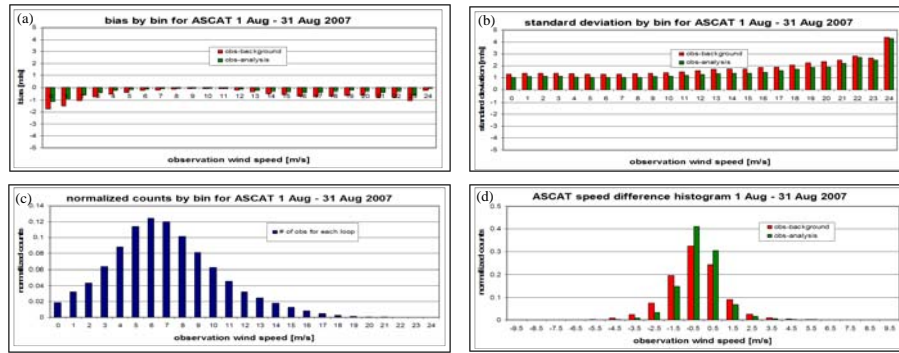
In this presentation, the results of two studies are given. The results of a study using December 2007 version Gridpoint Statistical Interpolation (GSI) and 25 km high resolution ASCAT data indicated that the assimilation of ASCAT surface wind retrievals improves forecast skill in terms of traditional anomaly correlation. A comparison of the attributes of forecasts using the ASCAT data to a set of control forecast experiments by computing the geographic distribution of Forecast Impact (FI) was performed. Positive forecast impacts are noted for wind speed field starting from 6 hour forecast. Both the results of the earlier study and with those from a study using more recent version of the GSI and low resolution ASCAT data (50km) thinned to 100km are shown here.

Experimental Design:

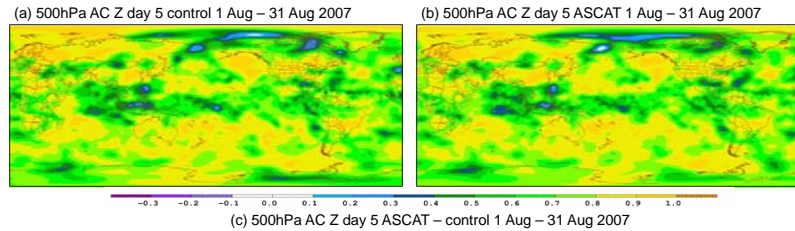
- Demonstrate forecast impact with ASCAT data in the NCEP GDAS/GFS.
- A December 2007 version of the GSI and GFS were used and run at T382L64 with 25km high resolution ASCAT data thinned to 100km. The time period studied is from 1 August to 31 August, 2007 and 1 January to 31 January 2008.
- A February 2008 version of the GSI and GFS were used and run at T382L64 with 50km low resolution ASCAT data thinned to 100km. The time period studied is from 1 August to 31 August, 2008 and 1 January to 31 January 2009.

Thanks to:

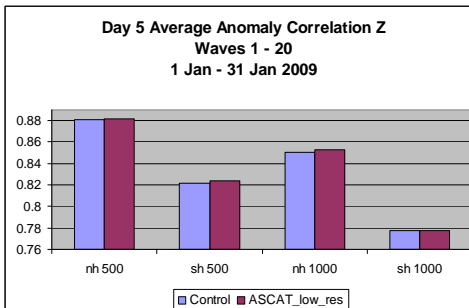
Stephen Lord (NCEP) for GFS/GDAS, computer resources and tape space.
John Derber and Lars Peter Riishojgaard for giving insightful advice.
Zorana Jelenak for providing ASCAT data.
Dennis Keyser and Stacie Bender for collecting and processing our various data streams.
The JCSDA for the computer time required for this study.



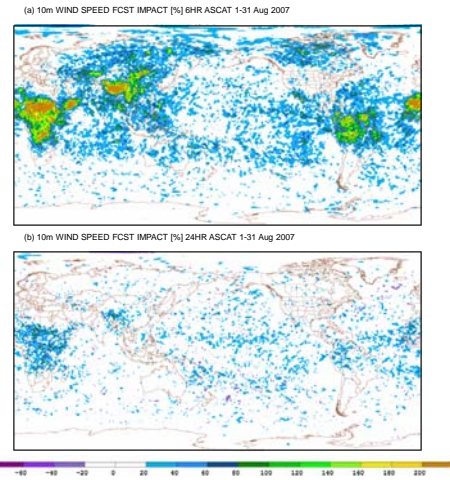
A comparison of the bias, standard deviation, wind speed histogram, and ASCAT wind speed difference histogram for ASCAT data from August 2007.



Geographic distribution of anomaly correlation of day 5 for 500hPa geopotential height from the control experiment (a) and ASCAT experiment (b) from August 2007. Panel (c) shows the difference between panels (a) and (b) using ASCAT minus control.



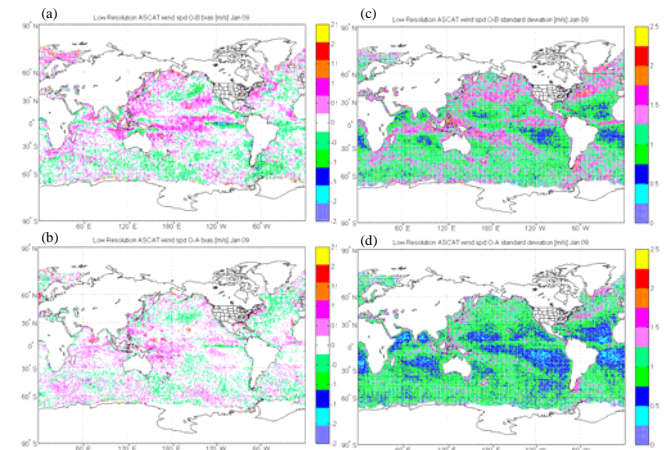
Day 5 anomaly correlation bar charts of geopotential height in the regions 20°-80°N in the Northern and Southern Hemisphere and for 1 Jan to 31 Jan 2009.



Geographic distribution of 10m wind speed forecast impact (%) at forecast hours (a) 6, and (b) 24 for August 2007.

ASCAT Quality Control

- Non-ocean observations rejected (GFS land, sea, ice flag)
- Observations that differ by more than 5 ms⁻¹ from the background are rejected (U,V).
- Sea surface temperature of 273K was used as a criteria to remove sea ice contamination.



A comparison of the geographic distribution of bias, standard deviation (for both O-B and O-A) for ASCAT. Panels (a) and (c) show the result from O-B and panels (b) and (d) show the result from O-A from Jan 2009.