Impact of QuikSCAT in the GEOS GCM

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The evaluation of QuikSCAT data at the DAO consisted of both subjective and objective comparisons of QuikSCAT winds to ship and buoy observations, GEOS and NCEP wind analyses, ERS–2 wind vectors, and SSM/I wind speeds. This was then followed by a series of data assimilation and forecast experiments using the GEOS DAS. The experiments were aimed at comparing the impact of QuikSCAT with that previously obtained with NSCAT, and assessing the relative utility of QuikSCAT, SSM/I, and ERS–2 winds, the relative contributions of QuikSCAT directional and speed information, and the effectiveness of the QuikSCAT ambiguity removal algorithms.

A Control assimilation was generated using all available data with the exception of satellite surface winds. Then assimilations were generated that added either SSM/I wind speeds, QuikSCAT wind speeds, ERS–2 unique wind vectors, QuikSCAT ambiguous wind vectors, QuikSCAT unique wind vectors, or the combination of QuikSCAT with ERS–2 and SSM/I. The results of this initial evaluation of QuikSCAT demonstrated potential for QuikSCAT data to improve meteorological analyses and forecasts, but also indicated ambiguity removal, and rain contamination problems that were limiting the application of QuikSCAT winds to data assimilation.

As an illustration of the impact of QuikSCAT data, Figure 1 shows anomaly correlations for a limited sample of GEOS–3 Control and QuikSCAT $500\ hPa$ height forecasts for the Northern Hemisphere extratropics and Southern Hemisphere extratropics. From this figure, it can be seen that there is a slight positive impact of QuikSCAT in the Northern Hemisphere extratropics and a larger positve impact in the Southern Hemisphere extratropics using this DAS.

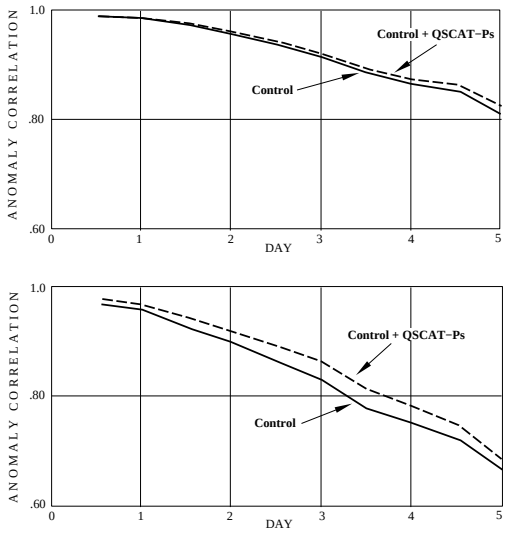

Figure 1 Relative impact of QuikSCAT data on GEOS–3 model forecasts. The $500\ hPa$ geopotential height anomaly correlations, averaged over four forecasts are shown for the (top) Northern Hemisphere extratropics and (bottom) Southern Hemisphere extratropics.

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