The Gridpoint Statistical Interpolation (GSI) data assimilation scheme is used in both NASA's and NOAA's global atmospheric modeling packages. In this presentation, we investigate the ability of the GSI to handle wind vectors derived from QuikSCAT, and propose future strategies for improvement.

In many situations, the influence of assimilating QuikSCAT wind vectors on NCEP GSI tropical cyclone analyses is minimal. This is perhaps due in part to the necessarily strict quality control, and the 'super-obbing' algorithm that removes smaller-scale structures that may be important near tropical cyclones. At least as important is the error covariance structure in the data assimilation. In order to isolate the effects of the covariance matrix, artificially 'perfect' surface wind observations are assimilated into the GSI. With the current quasi-isotropic, flow-independent error covariance specification, the correction to the tropical cyclone analysis is found to be mostly geostrophic, and significant only in the lower troposphere. Modifications to the tropical cyclone and environment at higher levels are minimal.

The introduction of anisotropic and flow-dependent error covariance information reveals a more significant influence of the surface wind observations throughout the vertical extent of the tropical cyclone, with a horizontal correction that departs from geostrophy. New data assimilation methods such as the Ensemble Kalman Filter offer considerable room for improvement in the treatment of ocean surface vector winds in global forecast systems.

[[*** If possible, please schedule this presentation immediately after that of Bob Atlas.]]