Ongoing and Future Improvements in HWRF Data Assimilation

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The operational HWRF data assimilation (DA) system is currently undergoing substantial changes that will impact future tropical cyclone forecasts. Previous versions of HWRF relied on global covariance or covariance derived from a warm-start HWRF ensemble. However, a recent upgrade allows for self-cycled covariance with an ensemble Kalman filter, which significantly improves use of inner core observations. This change ultimately means that inner core data can have a much greater impact on hurricane analyses than it did in the past. This change has been shown to significantly improve intensity forecasts, and a number of other advancements are being developed to further address problems with spindown of strong tropical cyclones.

In addition to advancements to the HWRF DA system, data usage in HWRF is also improving. Among the upgrades planned for 2017, HWRF will likely begin assimilating flight-level observations as well as several new types of atmospheric motion vectors. Initial testing has shown this new data has a very large positive impact on hurricane intensity forecasts. Another improvement being tested for future implementation is improved use of dropsonde telemetry, which is ultimately expected to improve use of inner-core dropsonde data.