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Satellite Radiance Assimilation with an Ensemble Adjustment Kalman Filter

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Satellite radiance assimilation capability has been developed with an Ensemble Adjustment Kalman Filter (EAKF) based data assimilation system (DART). This radiance assimilation capability makes use of the fast radiative transfer model, quality control procedure, observation thinning and bias correction algorithm built in a variational data assimilation system (WRF-Var). An interface between WRF-Var and DART allows that DART ingests WRF-Var calculated observations minus the background for radiance data. This reduced a lot coding efforts comparing to direct ingestion of radiance data into DART system. Vertical localization of radiance data in EAKF is realized by taking into account the weighting function of different channels.

The impact of assimilating AMSU radiance data in EAKF was evaluated for a Pacific Typhoon case (Morakot, 2009) with the Weather Research and Forecast (WRF) model. The analysis and prediction of Typhoon's track, intensity and rainfall from EAKF were compared with the results from a 3DVAR system. Preliminary results are encouraging and will be presented in the talk.