

## ***Direct Radiance Assimilation for WRF: Implementation and Initial Results***

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Weather and Research Forecast (WRF) model as well as its variational assimilation system (WRF-Var) is widely used by both research community and the operational NWP centers in US (Air Force Weather Agency) as well as a number of international WRF partners in Asia, the Middle East, and Europe. A general satellite radiance assimilation framework has been developed in the WRF-Var system in the past two years. The WRF-Var radiance assimilation capability was designed for meeting requirements of both basic research and operational applications, which will be available to research community with the next WRF release. This presentation will begin with an overview of radiance assimilation capabilities in WRF-Var, including the core component -- Fast Radiative Transfer Model (RTM), air-mass dependent bias correction algorithm, quality control and observation error tuning and so on. In particular, two widely used RTMs, RTTOV developed by EUMETSAT in Europe and CRTM developed by JCSDA in USA, are incorporated into WRF-Var system. A preliminary comparison between RTTOV and CRTM will be presented. Recent results on assimilating microwave radiance data to improve Hurricane track and intensity forecast will be also presented. Results for the Katrina case show that assimilating AMSU-A radiance improves both track and intensity forecast, even most data are discarded over Hurricane vortex area. One will also present a cloud/rain affected radiance assimilation scheme, which uses total cloud water as the control variable and a warm-rain physics process to partition total water to moisture and hydrometeor increments.

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