# Development of real time all-weather layer precipitable water products in AWIPS II by fusing the GOES-R and NWP for local forecasters

- Operational GOES-R LAP product is available in clear skies only and the layer precipitable water (LPW) is not available for users;
- This project will develop methodologies and techniques for high temporal and spatial resolution GOES-R ABI LPW products under all sky conditions by fusing NWP forecasts and GOES-R ABI IR radiances;
- GFS and other regional NWP models (NAM, HRRR) and GOES Sounder radiances will be used (as proxy);
- The current GOES sounding algorithm under cloudy skies (Li et al. 2009) and the operational GOES-R LAP algorithm under clear skies (Jin et al. 2008) will be adapted for all sky LPW generation;
- The product will be made available in real time through AWIPS II so that the local forecasters can refer to these products in their forecast issuance;
- The application of the products will be demonstrated at the NWS Forecast Office at Sullivan, WI and expand the applications to other forecast offices;
- FY14 tasks will focus on: (a) Implementation of cloud detection and cloud phase detection for GOES Sounder, (b) Cloudy RTM development for GOES-R ABI IR bands, (c) Develop cloudy training dataset for GOES-R ABI LPW retrieval over GOES-R/S coverage, (d) Version 1 LPW algorithm under cloudy sky conditions for both ABI and GOES Sounder, and (e) Cases with GOES Sounder LPW data in CIMSS satellite blog so that the local user can access.
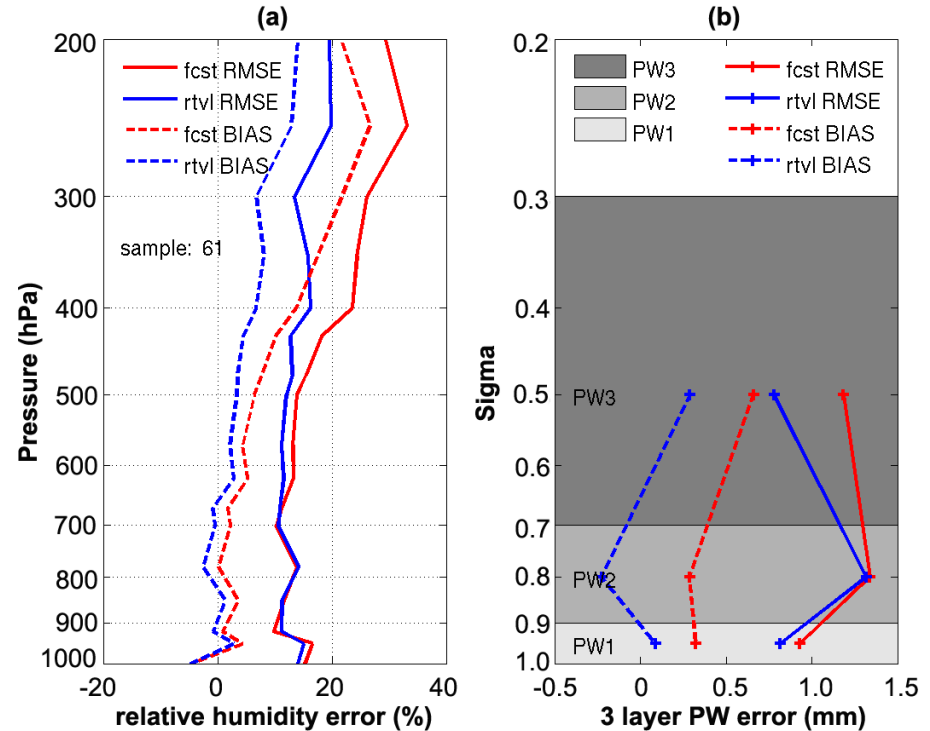
Error profiles of (a) relative humidity and (b) 3 layer PW for thin clouds with COT less than 2.0 using RAOB/GOES/GFS-ARM match-up database. The dotted red line represents NCEP GFS forecast bias, the solid red line represents NCEP GFS forecast RMS, the dotted blue line represents retrieval bias, and the solid blue line represents retrieval RMS. The shaded areas in (b) show the vertical coverage for each PW.

Real time high temporal GOES-R all weather TPW and LPW products for local forecasters

Jun Li (CIMSS)