Project title: Assimilation of high resolution GOES-R ABI infrared water vapor and cloud sensitive radiances using the GSI-based hybrid ensemble-variational data assimilation system to improve convection initiation forecast

PI Xuguang Wang (University of Oklahoma (OU)), Co-PI(s) Jason Otkins (U. Wisconsin), Thomas Jones (OU), Aaron Johnson (OU), Xiaoyan Zhang (NCEP), Yanqiu Zhu (NCEP)

NOAA Goal: Improving Operational Environmental Prediction by using GOES-R data in NWP & Data Assimilation (DA)
Application/service addressed by the project: improve NWS operational convective scale NWP with a focus on convection initiation (CI)
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• **Project Goal**
Extend the NWS GSI-based hybrid ensemble-variational DA system to assimilate high resolution GOES-R ABI infrared water vapor and cloud sensitive radiances into the convection resolving regional model and study their impact on CI forecasts when combined with other ground based observations (e.g., mesonet observations, radar).
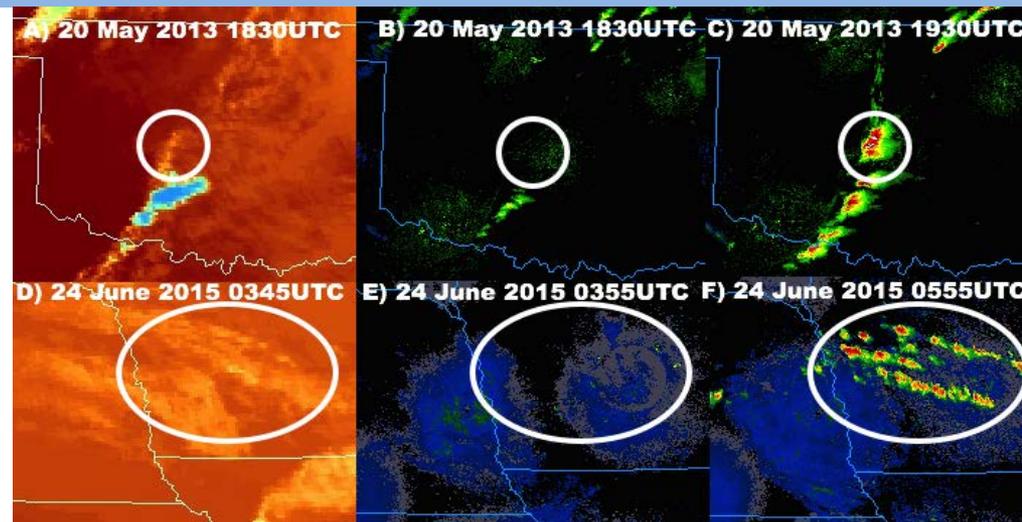
Fig. GOES-west infrared image at 1830 UTC 20 May 2013 showing rapidly deepening cumulus clouds before any radar indications of CI, (b) NEXRAD radar reflectivity composite at the same time, and (c) radar reflectivity one hour later after the tornadic supercell had developed from those deepening cumulus clouds. (d)-(f) are as in (a)-(c) but for case of elevated nocturnal CI at (a) 0345 UTC 24 June, (b) 0355 UTC 24 June, and (c) 0555 UTC 24 June.