

Assimilation of GLM data using HVEDAS

- **Title: Utility of GOES-R Geostationary Lightning Mapper (GLM) using hybrid variational-ensemble data assimilation in regional applications**
- **Lead:**
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- **Main Participants:**
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- **Outside Collaboration:**
 - » Stephen Lord, NCEP/EMC
- **Motivation:**
 - » Combine GOES-R data with current operational data
 - » Focus on Geostationary Lightning Mapper (GLM)
 - » Assess the utility of GLM in future NOAA operational environment, based on the use of a hybrid variational-ensemble data assimilation system (HVEDAS)
 - » Examine the benefit of combining GLM data with other data available today in NOAA operations

- Research Goals:
 - » Develop a capability to use GOES-R Geostationary Lightning Mapper (GLM) observations in a prototype hybrid variational-ensemble data assimilation system (HVEDAS) and evaluate its impact in regional data assimilation.
 - » In order to enhance the GLM utility, combine GLM assimilation with assimilation of all-sky microwave (MW) satellite radiance observations. (Both types of observations have a potential to introduce relevant information related to cloud microphysics and thus impact the analysis and prediction of severe storms and other extreme weather events).
 - » Evaluate assimilation of GLM proxy data using NOAA operational system components and a prototype HVEDAS.
 - » Demonstrate the utility of the GOES-R GLM in severe weather data assimilation.

- Methodology and system components:
- (1) Basic setup:
 - Interface the WRF-NMM modeling system with MLEF to assimilate NCEP current operational observations.
 - Use the NCEP Gridpoint Statistical Interpolation (GSI) as observation operator.
 - Use the Community Radiative Transfer Model (CRTM) for assimilation of radiances (clear-sky *and* all-sky).
- (2) Develop/adapt the GLM forward operator for use in GLM (LLDN) data assimilation.
 - Depends on the model's microphysics scheme complexity.
 - No dynamical link between cloud microphysics and static electricity.
 - Need to rely on regressions.
- Future plans:

If there is NOAA interest in further investigation/implementation of GLM observations in data assimilation, support such an effort in collaboration with EMC.

More detailed information on the poster