Abstract
Hybrid 3DVAR incorporates flow-dependent information from the ensemble perturbations into the static background error covariances used in 3DVAR, and has been shown to have positive impact on global forecasts and some regional applications. In this study, GSI (Grid-point Statistical Interpolation)-Hybrid is being tested for the HWRF (WRF for Hurricanes) system. A case study is performed for Bret 2011 and slightly positive impact from the GSI-Hybrid data assimilation is shown for the hurricane forecast, in comparison to pure GSI 3DVAR applied for HWRF. Further studies are being conducted to assess the impact of satellite radiance data in the framework of GSI-Hybrid and preliminary results show that regionally tuned BC contributes to further improvements.

Operational HWRF configuration
- Model forecast domains: outer and inner
- HWRF vortex initialization domain: 4x
- GSI analysis domain: outer (0.18deg) and ghost (0.06deg)
- TCVital: Tropical Cyclone Vital Statistics
- Deep storm: estimated top of circulation is 200 mb

Experiment design
- HWRF: No Regional GSI, initialized with HWRF gfs/DCY
- GSI-3DVAR: [state BE]
- GSI-Hybrid: Beta1 = 1.0
- Best Track: [courtesy of NHC]

Testing and Evaluation of the GSI-Hybrid Data Assimilation for Hurricane Forecasts – A Case Study
Chunhua Zhou¹, Hui Shao¹, Ming Hu², Ligia Bernardet², Xiang-Yu Huang¹ and Brian Etherton²
¹National Center for Atmospheric Science (NCAR), ²NOAA/Global Systems Division

Discussion
- GSI-Hybrid is not a strong storm; GSI only run at 201071818 and 201071900 by 2011 HWRF operational configuration.

Acknowledgments: This work is sponsored by the Hurricane Forecast Improvement Program (HFIP)