

# Improving Winter Storm Forecasts with Dropsonde Data

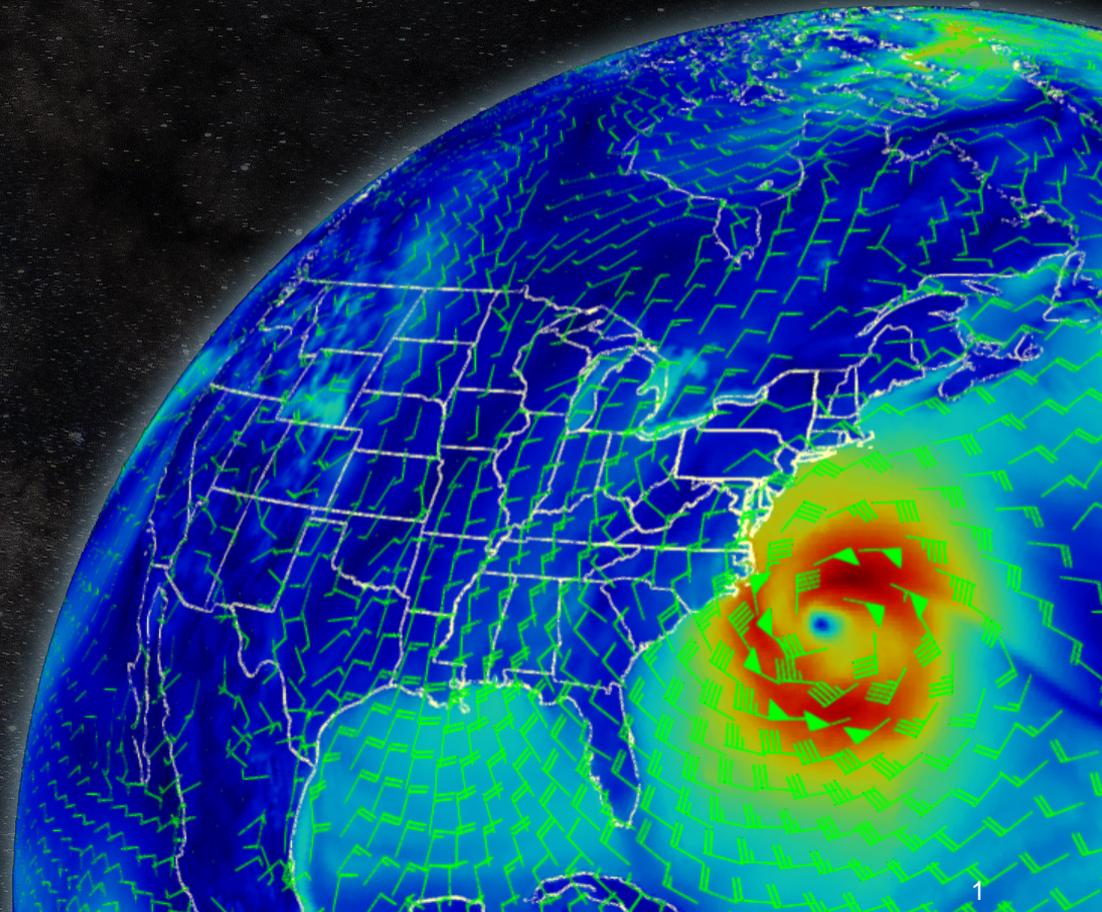
Jason M. English

CIRES

Performing work for ESRL/GSD



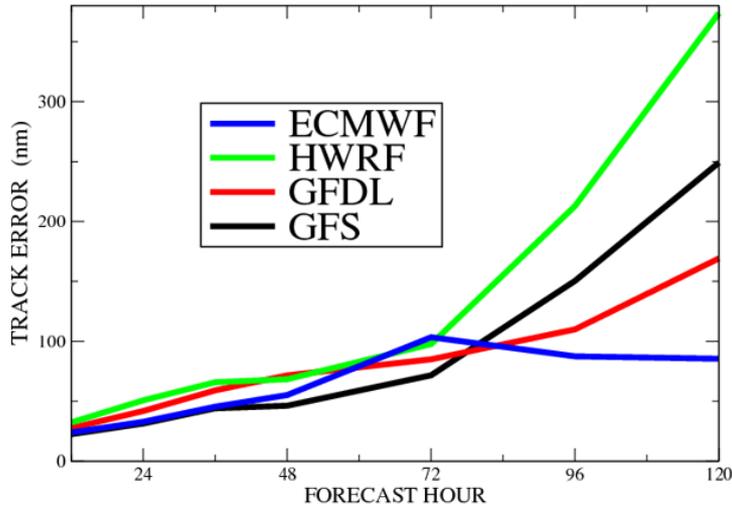
GSD Science Review  
3-5 Nov 2015



# Motivation

GFS model had >3 day track errors with Hurricane Sandy

HURRICANE Sandy (Track error)  
Number of cases : (28, 26, 24, 22, 18, 14, 10)



Does GFS need improved model resolution, physics, or **data assimilation**?

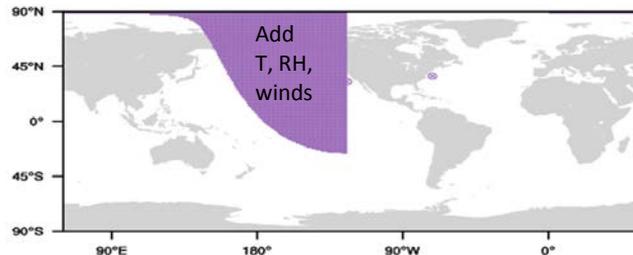
Data from NASA/NOAA fleet of Global Hawk Unmanned Aircraft may improve **data assimilation**: Observing System Experiments (OSEs)



*Instead of flight campaigns, we can simulate dropsonde data from a “perfect” model and determine whether it improves GFS forecast accuracy: Observing System Simulation Experiments (OSSEs)*

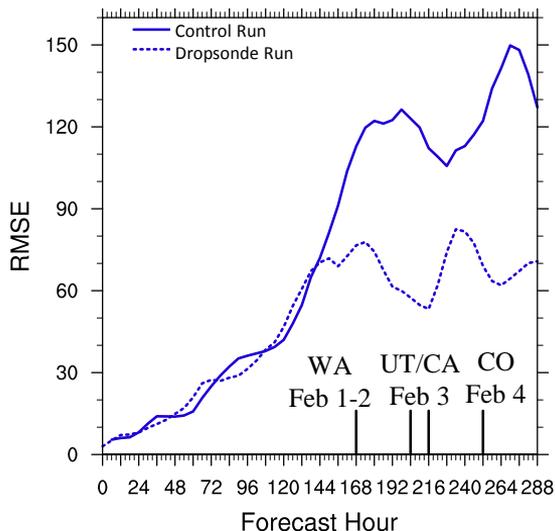
# A Tale of Two Storms

OSSE study: Initialize GFS model with perfect observations from the Nature Run and evaluate winter storm accuracy

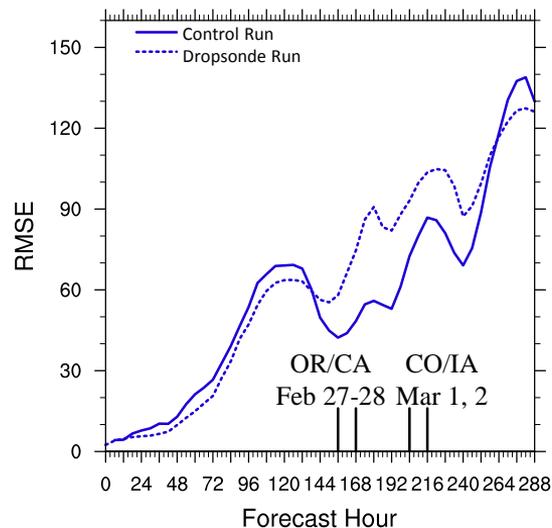


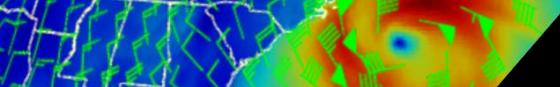
## 500 mb Geopot. Heights (CONUS)

“Jan 30 Storm” (initialized Jan 25 00Z)



“Feb 25 Storm” (initialized Feb 20 00Z)





# Summary

- GFS model had >3 day track errors with Hurricane Sandy; was this due to model resolution, physics, or data assimilation?
- The NASA/NOAA Global Hawk Unmanned Aircraft can provide observations for data assimilation, and forecast improvements can be quantified (OSEs)
- GFS forecasts initialized with perfect observations over the Pacific Ocean from the Nature Run are analyzed for two winter storms (OSSEs)
- Forecasts are improved for 7-day forecast of Jan 30 storm but not Feb 25 storm. Why? Come to the poster to find out!