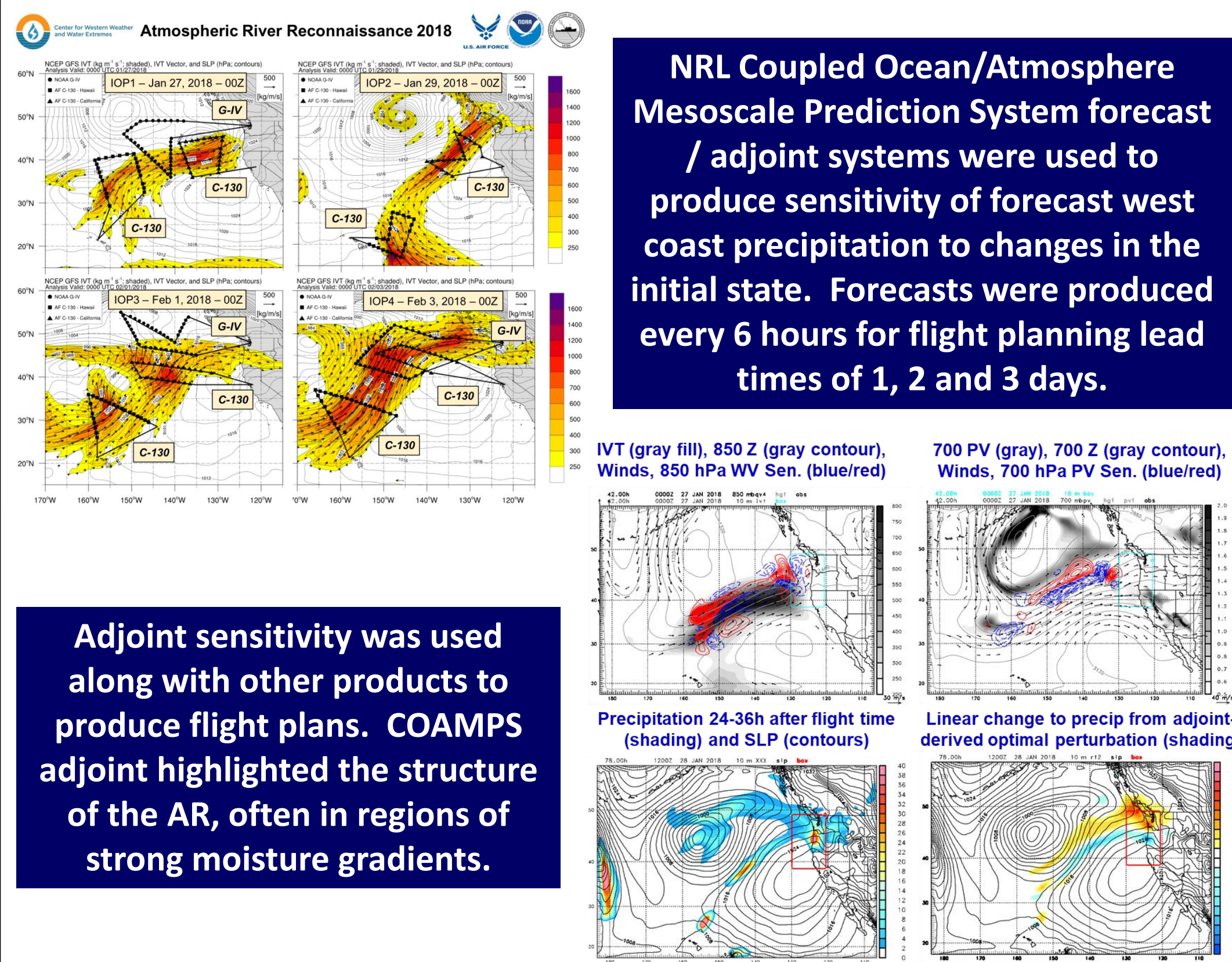


Naval Research Laboratory Preliminary Results from AR RECON 2018

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SPECIAL THANKS TO THE ENTIRE AR RECON 2018 TEAM

1. AR RECON 2018

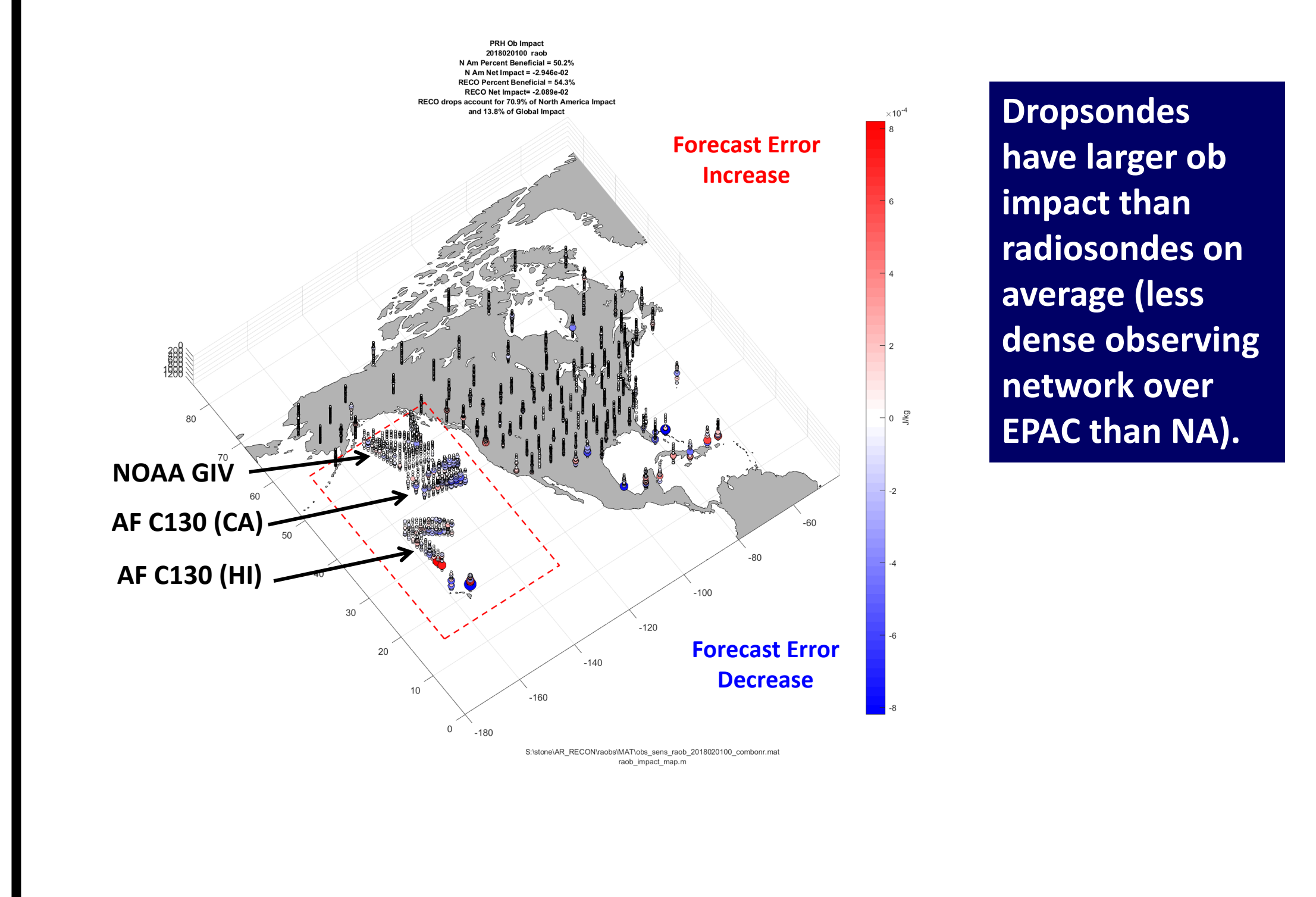


2. Observation Impact Studies with NAVGEM

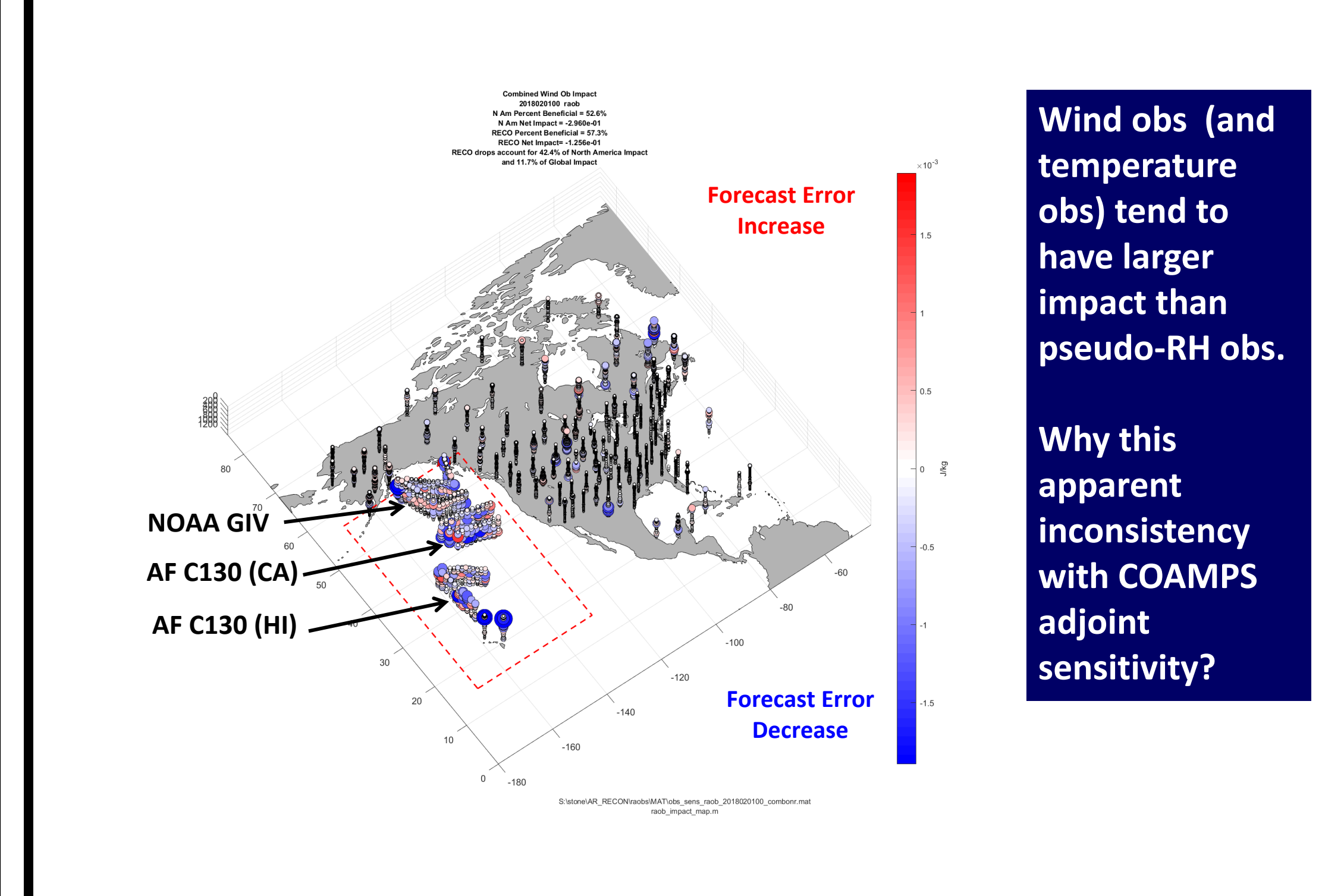
The Navy Global Environmental Model is used to look at the impact of the reconnaissance "RECON" observations on the analysis and short term forecasts

- Forecast Sensitivity/Observation Impact (FSOI): Uses the adjoint of the forecast model and the adjoint of the hybrid 4-d VAR data assimilation system to calculate the impact of each observation on the 24-h forecast error
 - Forecast error is measured in terms of global total energy
 - Compare the impact from RECON with North American Radiosondes
 - Compare the impact from moisture, temperature and wind observations
- Data Denial Studies: Run the DA-Forecast system with and without the AR RECON observations
 - How is the model AR changed by "standard" observations?
 - How is the model AR changed by RECON observations?
 - How does the "signal" from the RECON observations propagate downstream?
- Future Work:
 - Perform similar experiments with COAMPS
 - Quantify NA forecast skill changes due to dropsondes

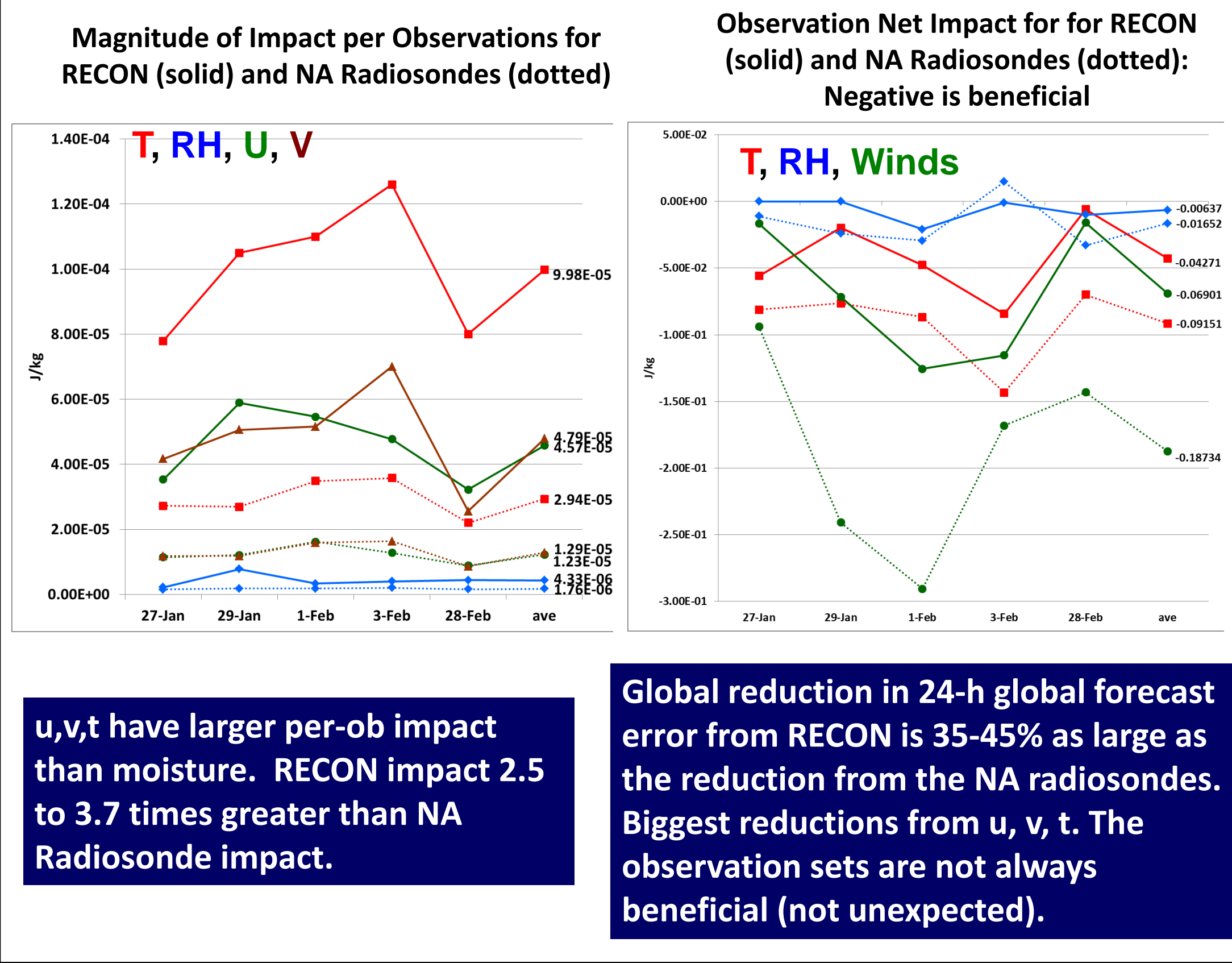
3. Observation Impact Studies with NAVGEM IOP3: 1 FEB Ob Impact from Dropsondes and NA Radiosondes for Pseudo-RH



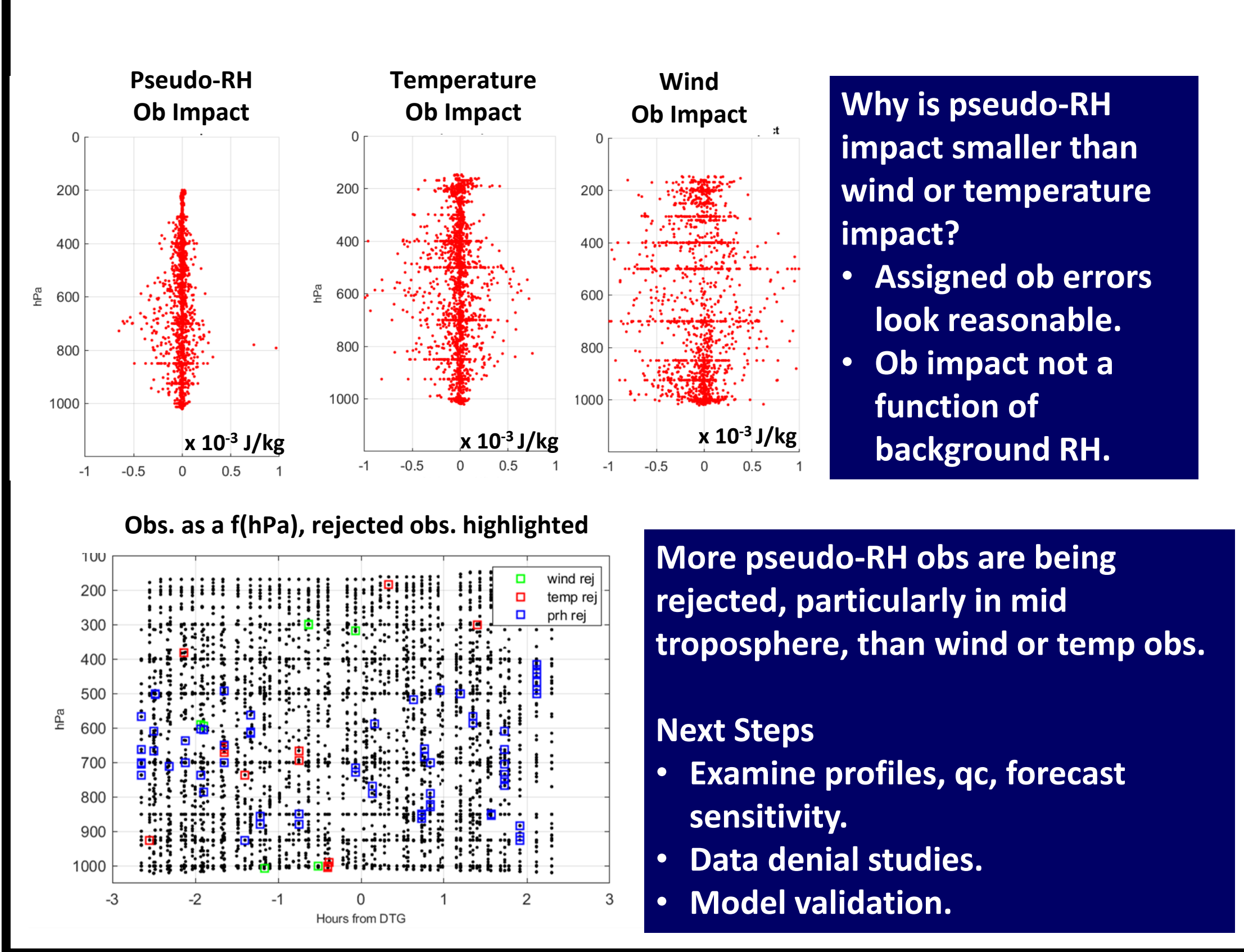
4. Observation Impact Studies with NAVGEM IOP3: 1 FEB Ob Impact from Dropsondes and NA Radiosondes for Winds



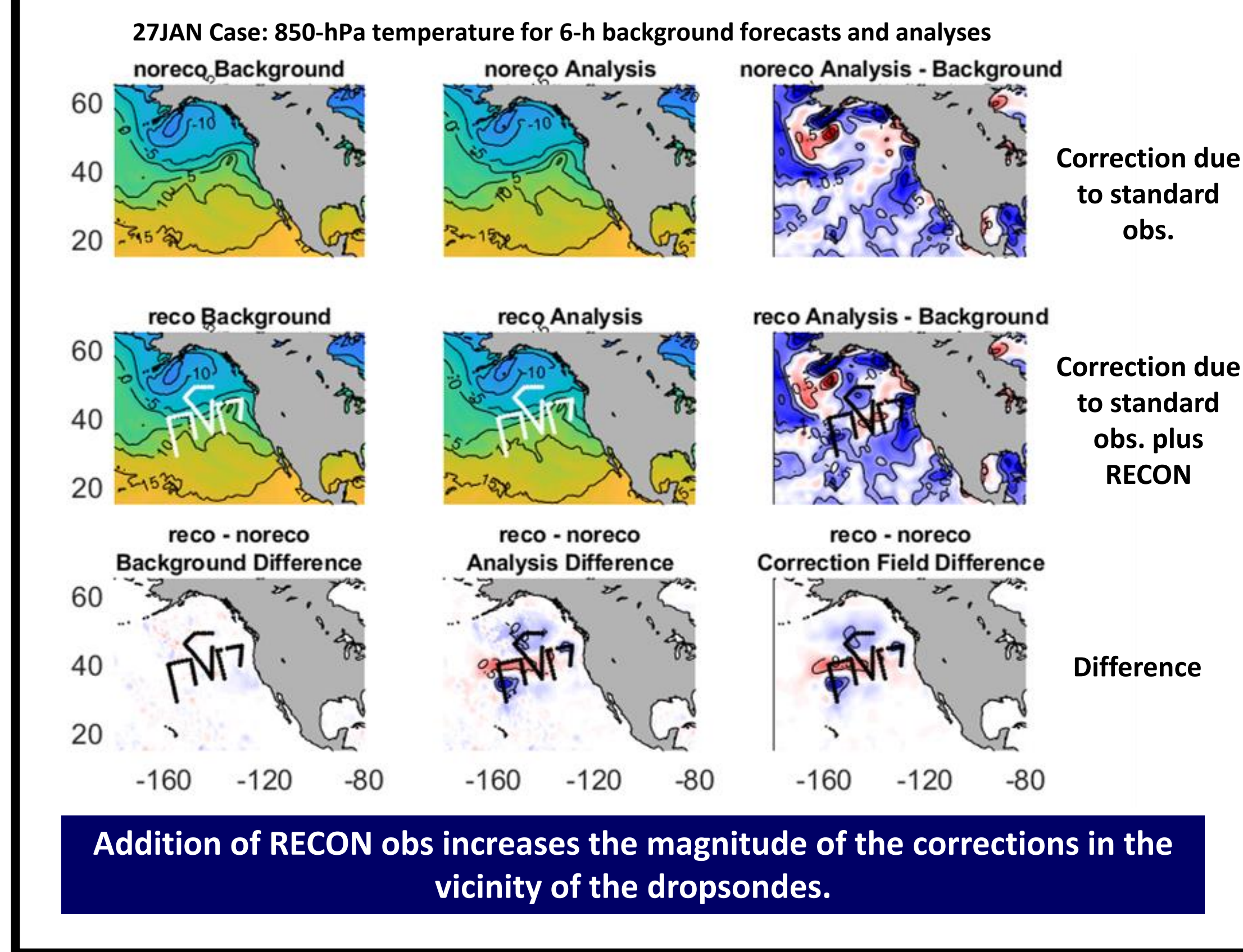
5. Observation Impact Studies with NAVGEM



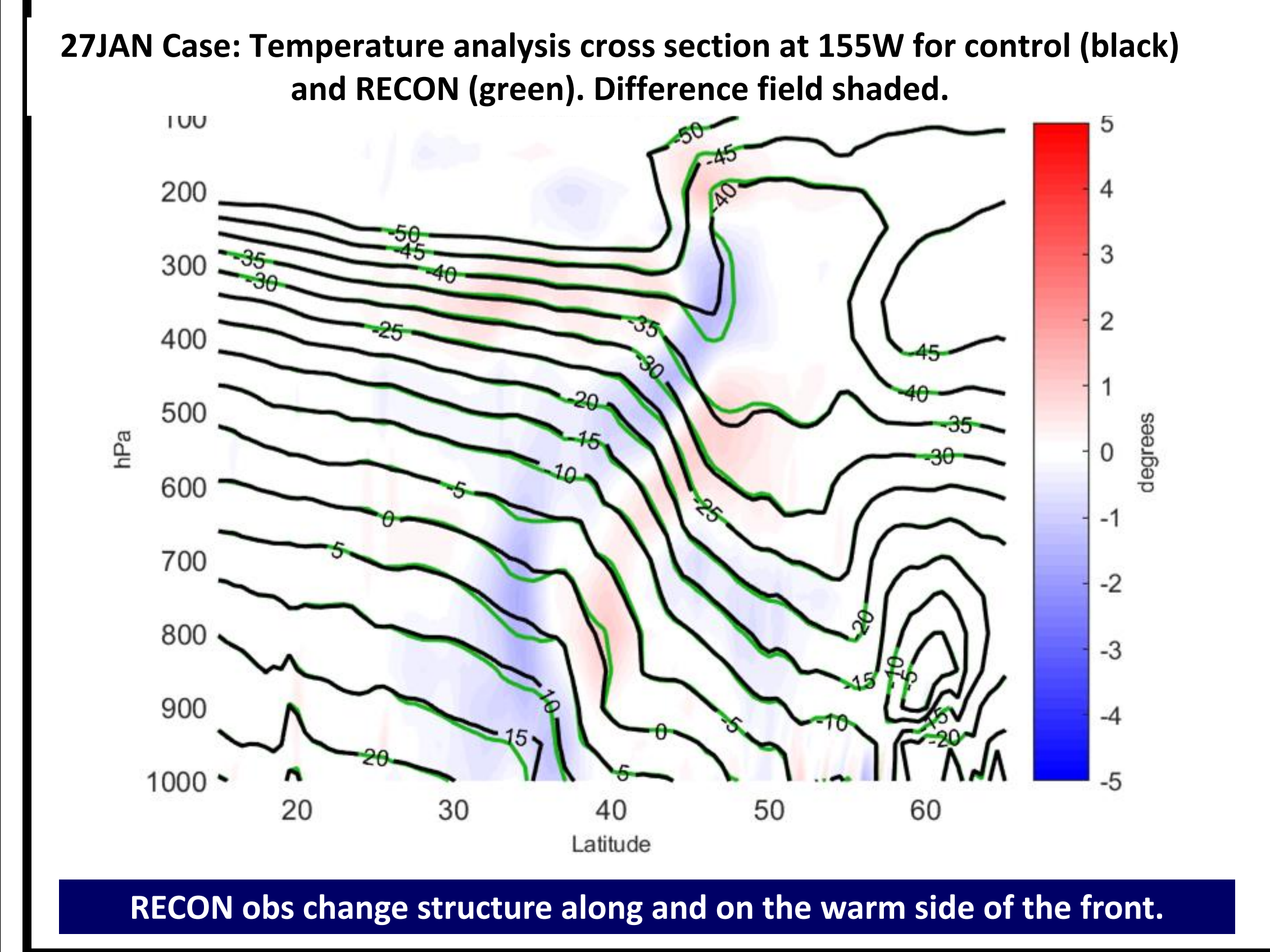
6. Observation Impact Studies with NAVGEM



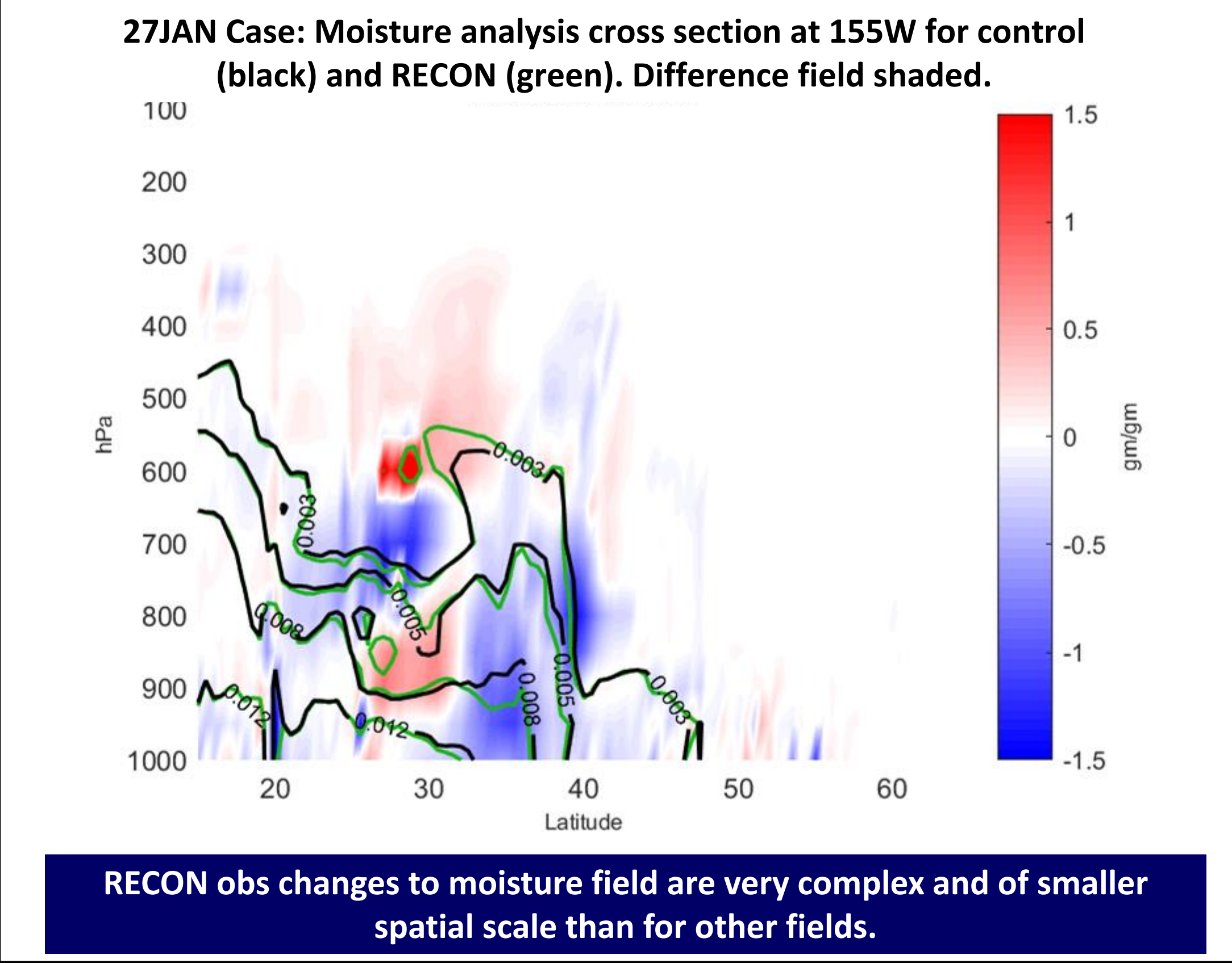
7. Data Denial Studies with NAVGEM



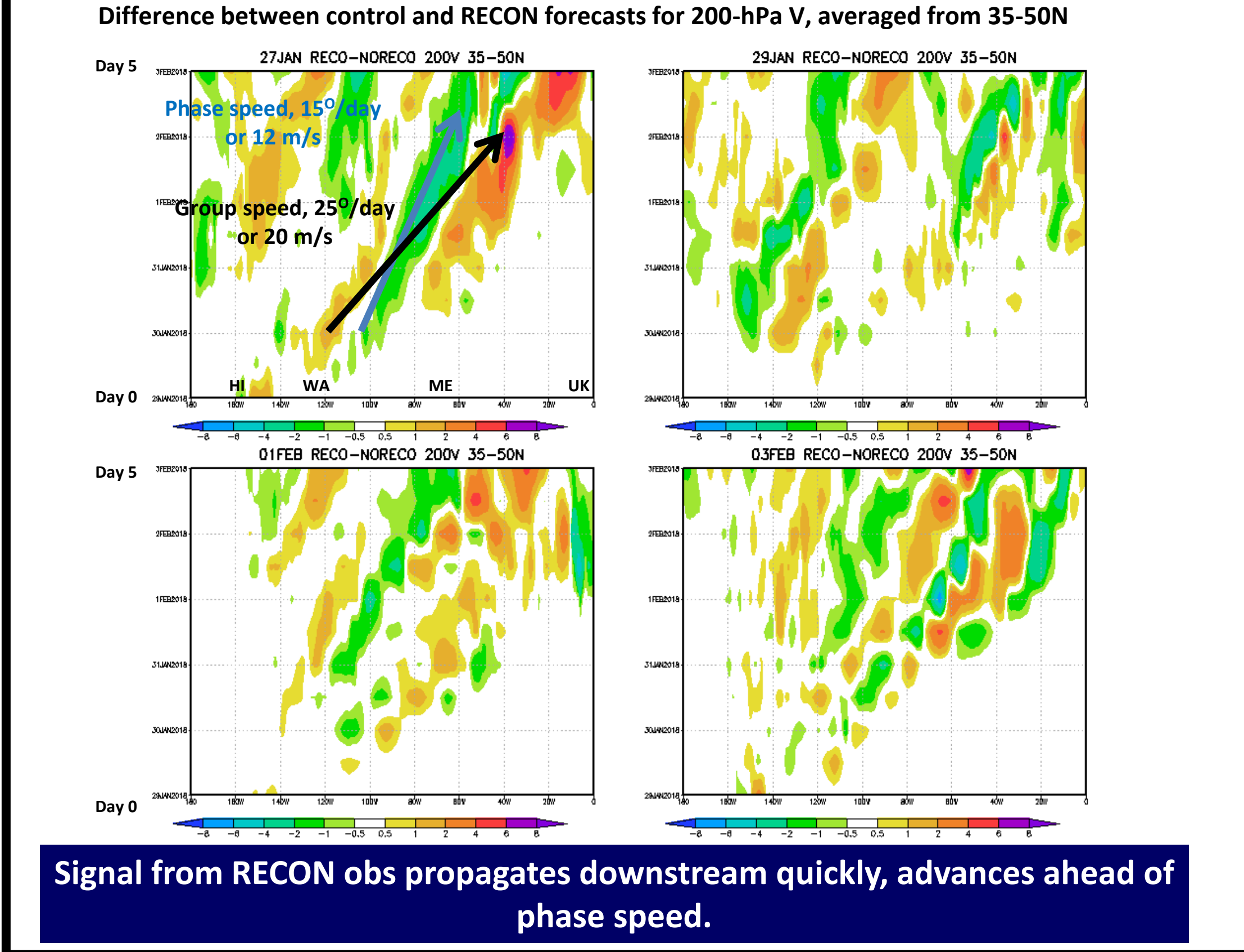
8. Data Denial Studies with NAVGEM



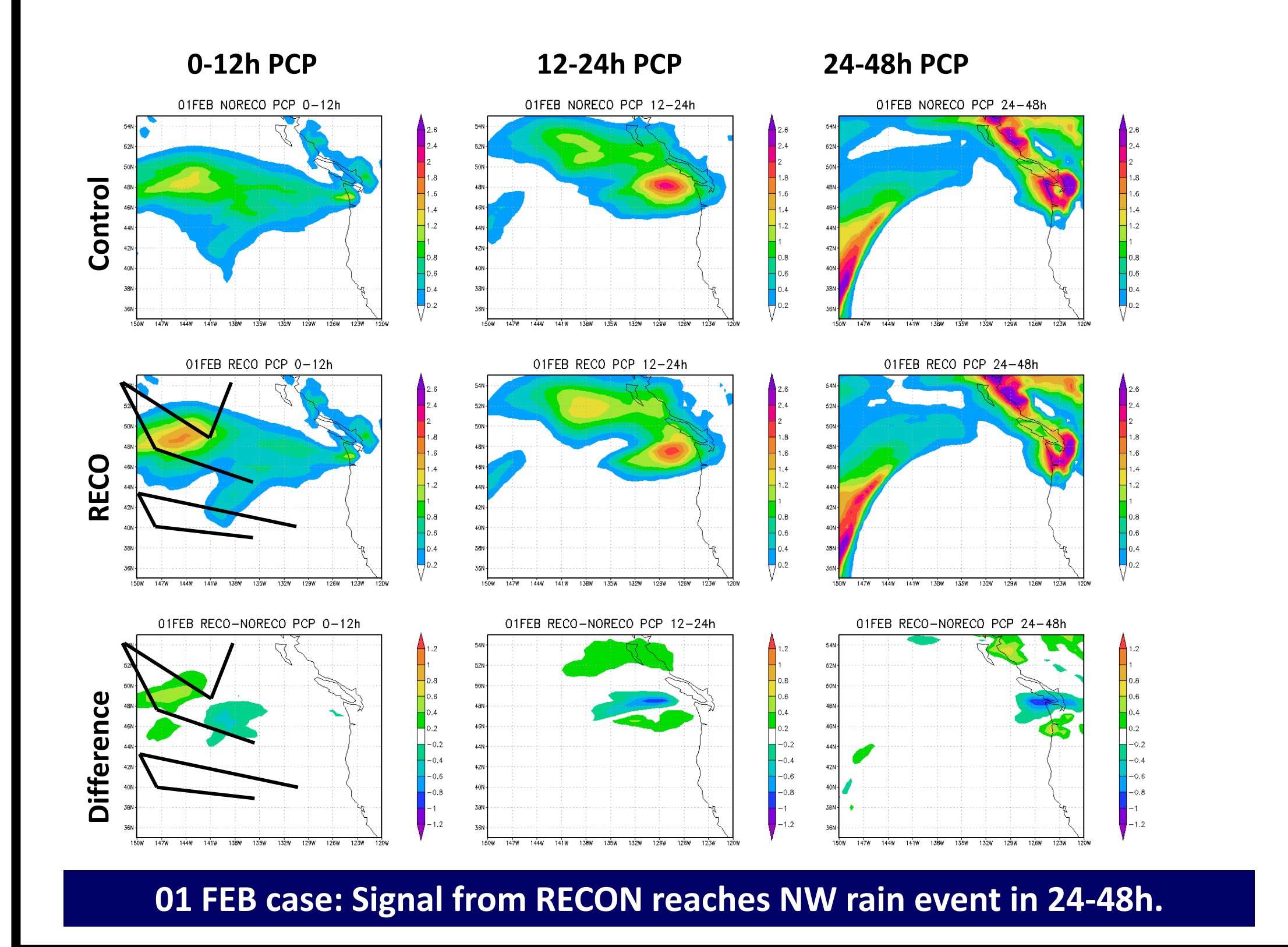
9. Data Denial Studies with NAVGEM



10. Data Denial Studies with NAVGEM



11. Data Denial Studies with NAVGEM: Precipitation Signal from RECON obs



12. Summary and Future Work

- What we have found in NAVGEM:
 - Magnitude of the impact of RECON obs are 2.5 to 3.5 x larger than that of NA radiosonde obs for a global error metric.
 - Largest impact from temperature and wind obs, smaller impact from moisture obs.
 - RECON observations result in complex structure changes. Changes propagate downstream quickly.
- What we don't know yet (future work):
 - What is the quantitative impact of RECON obs on NA forecast skill?
 - Why is impact of moisture obs smaller than expected?
 - What are the results in COAMPS?

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