



Estimating Moist Static Energy Variability in Mature Hurricanes: Modeling and Observational Perspectives

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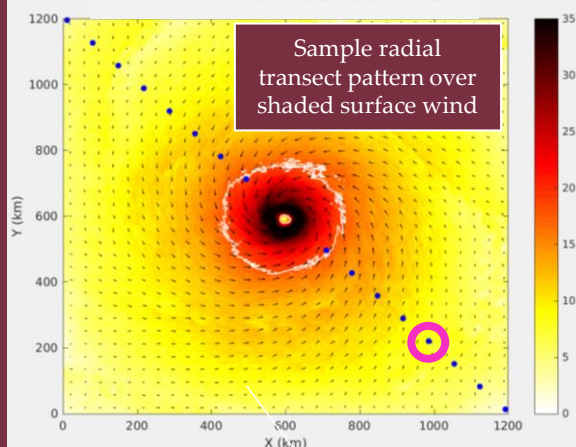


Feedbacks on TC intensity (i.e. surface enthalpy fluxes/differential longwave cooling) also increase spatial variance of MSE.

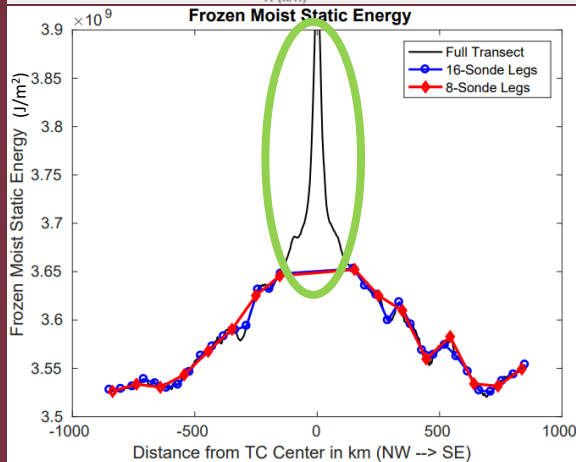
Can we capture this variance w/ sparse observations? If so, we can quantify these feedbacks to analyze TCs w/ dropsondes!

System for Atmospheric Modeling (SAM¹) Simulations

Khairoutdinov and Randall (2003)



- Choose various patterns of **grid points** to represent dropsondes
- How good are our calculations of MSE variance and feedbacks compared to using the full domain/TC-centered box?

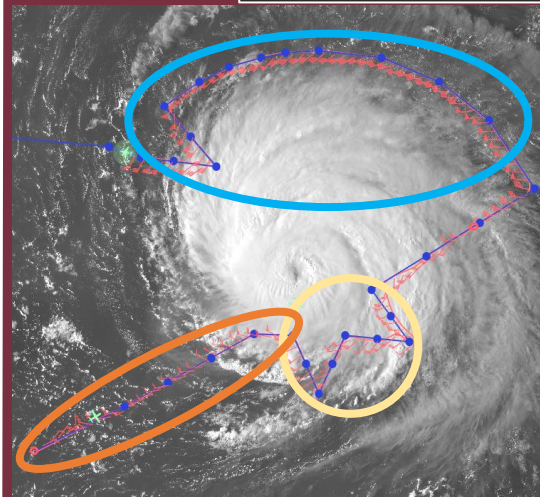


- Typical upper-air patterns **miss inner-core extrema.**
- But they capture MSE variance and relevant feedbacks fairly well.

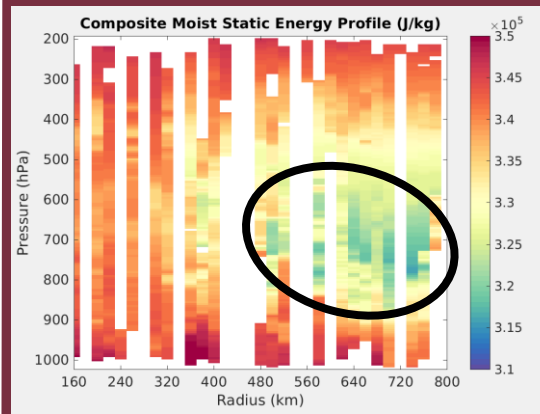
An encouraging outlook to begin testing w/ observations!

Dropsonde Observations: Teddy and Sally

NOAA IFEX Hurricane Field Progn. Teddy: Stanford Univ./NOAA HRD Sally: NOAA HRD/ONR TCRI



- Teddy flight has 3 legs: **Transect, Star, Arc.** Samples outer environment well, but not core.
- Sally flights **sample inner core well**, but little outside 400 km from center.
- Teddy: Mid-level **minimum** in MSE at far radii due to envelope of dry air.
- Combined: Approximately linear decrease in column-integrated MSE w/ distance.



Need widest radial coverage possible!
But potential exists for this perspective to aid in real-time intensity forecasts.

