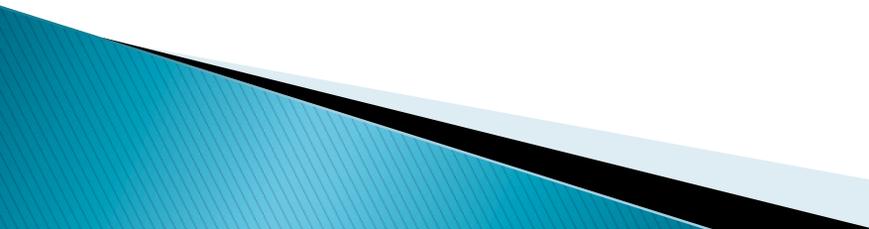


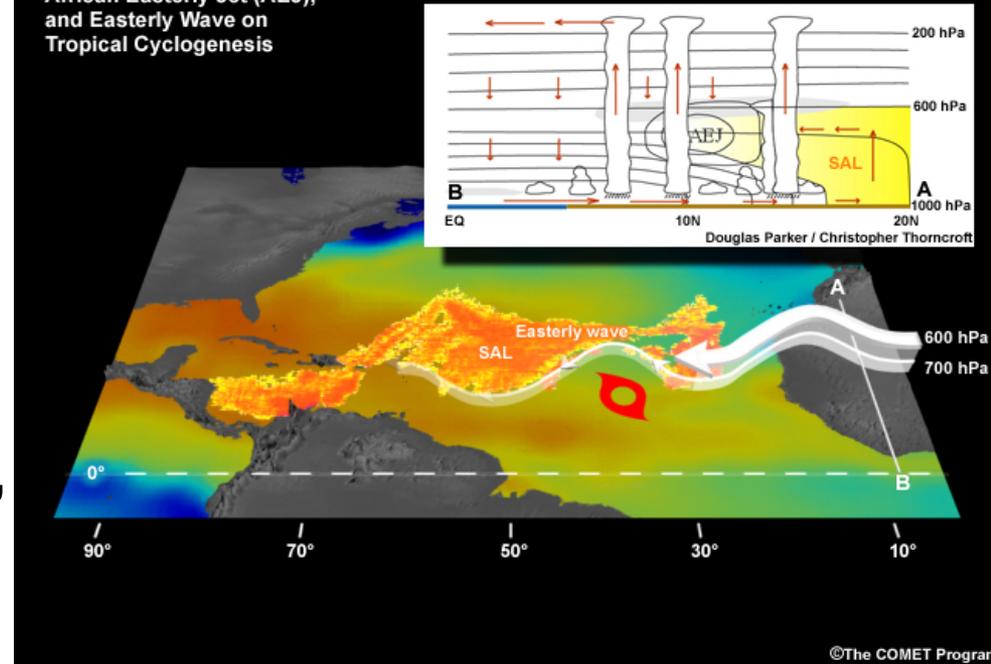
Science Topics

- ▶ **Saharan Air Layer**
 - Basic SAL structure
 - Roles of dry air intrusions, high stability, enhanced shear
 - ▶ **Upper-tropospheric flow**
 - Role of upper-level vertical shear
 - Outflow layer processes
 - ▶ **Inner-core processes**
 - Warm core formation and evolution
 - Convective bursts and intensity change
 - ▶ **Genesis**
 - Pouch structure (evolution?)
 - Convection and vortex (wind field) changes
 - ▶ **Extratropical Transition**
- 

The Saharan Air Layer

- Does the SAL suppress or favor development?
- To what extent does dry, dusty air penetrate into the core?
- How does SAL structure evolve as it crosses the Atlantic?

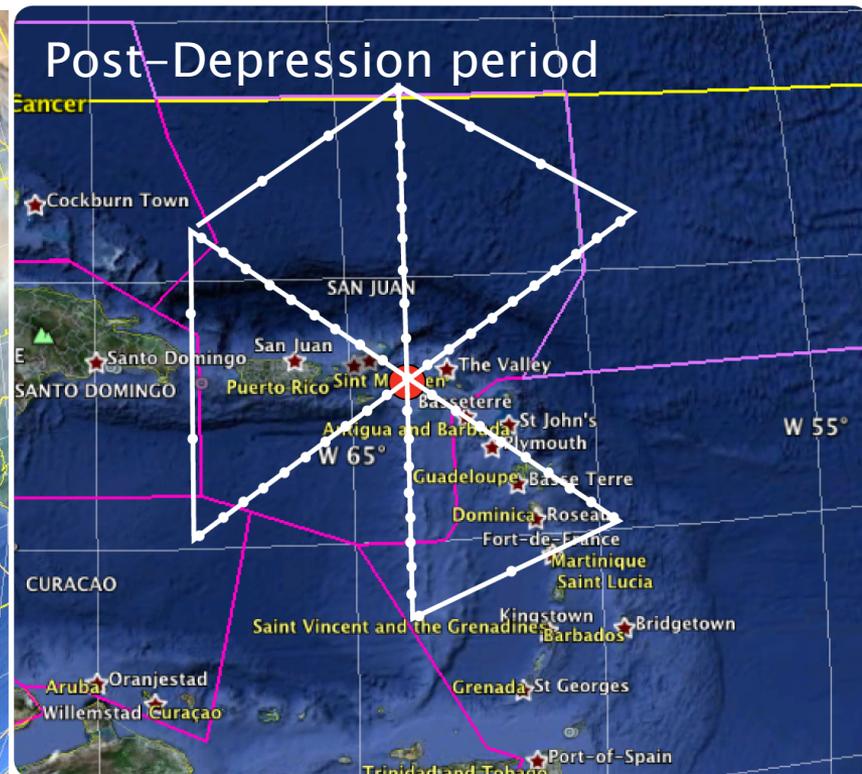
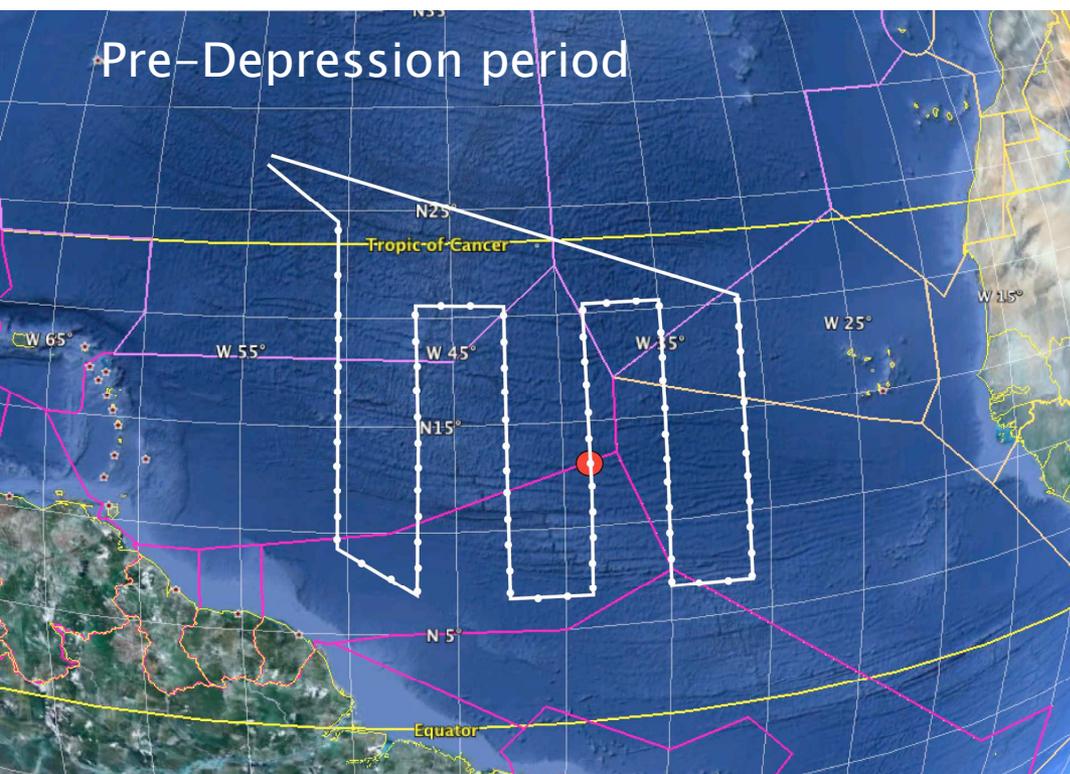
Influence of the Saharan Air Layer (SAL), African Easterly Jet (AEJ), and Easterly Wave on Tropical Cyclogenesis



- Key instruments
 - CPL, S-HIS, AVAPS, TWiLiTE will track SAL in environment
 - Requires env. GH spend significant time in clear-air environment
 - HAMSR will track intrusion of dry air into inner-core region

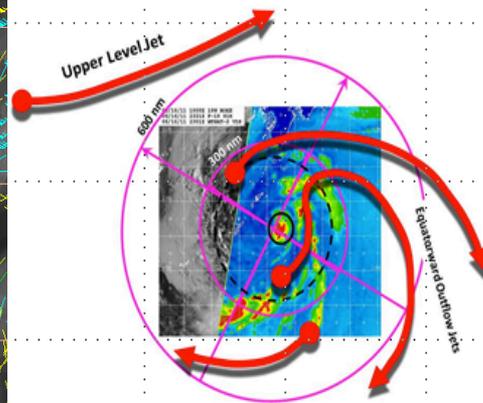
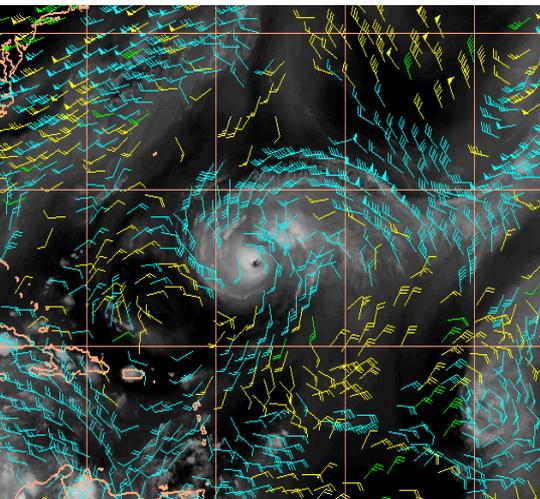
SAL Flight Modules

Environmental Global Hawk Flights

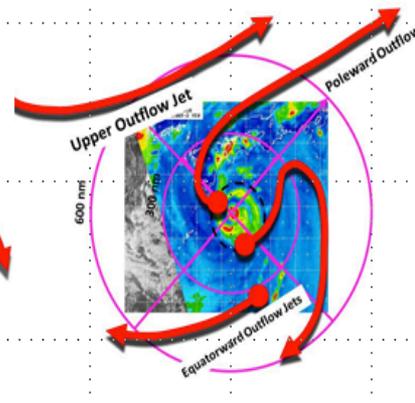


Upper-Tropospheric Flow Influences

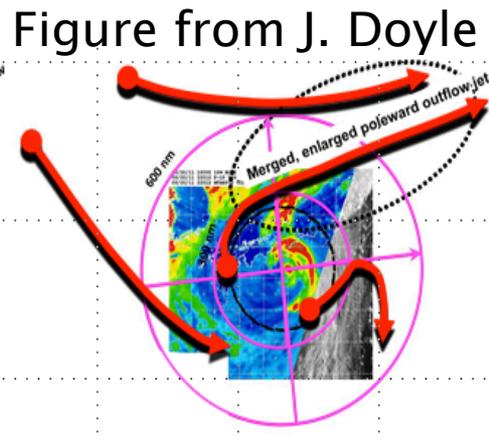
- Is upper-level vertical shear a critical determinant of development?
- Do environ. interactions with outflow govern intensity?
- What are the thermo. and dynamic characteristics of the outflow layer?
- Key instruments
 - CPL, S-HIS, AVAPS, TWiLiTE will provide critical measurements



Phase I



Phase II

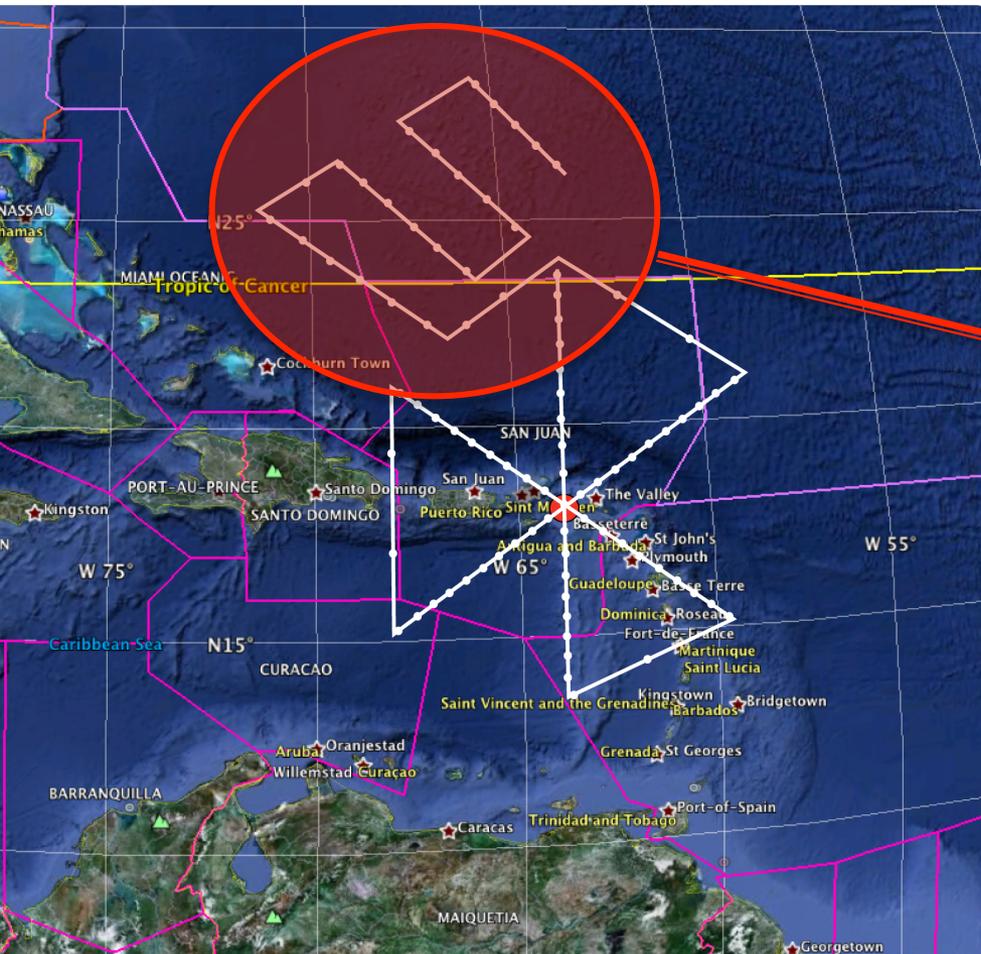


Phase III

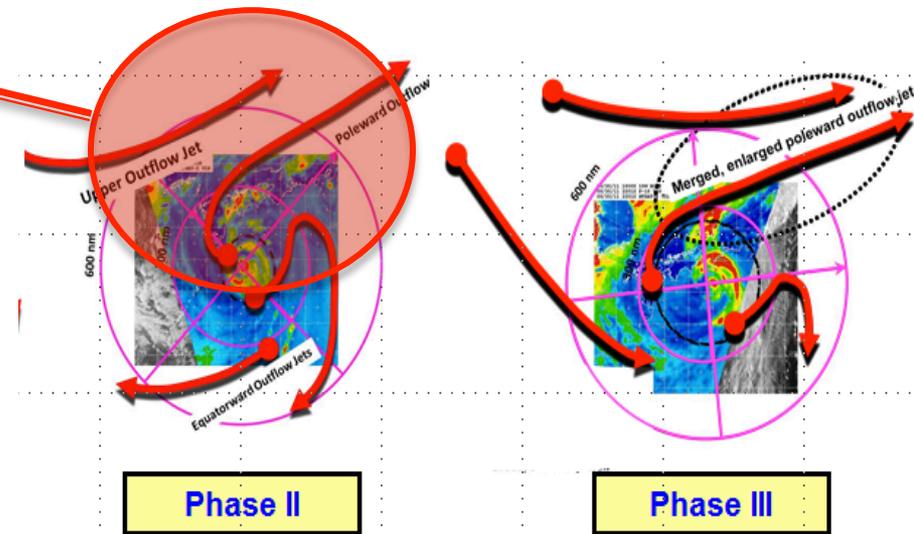
Figure from J. Doyle

Potential Flight Modules

Environmental Global Hawk Flights

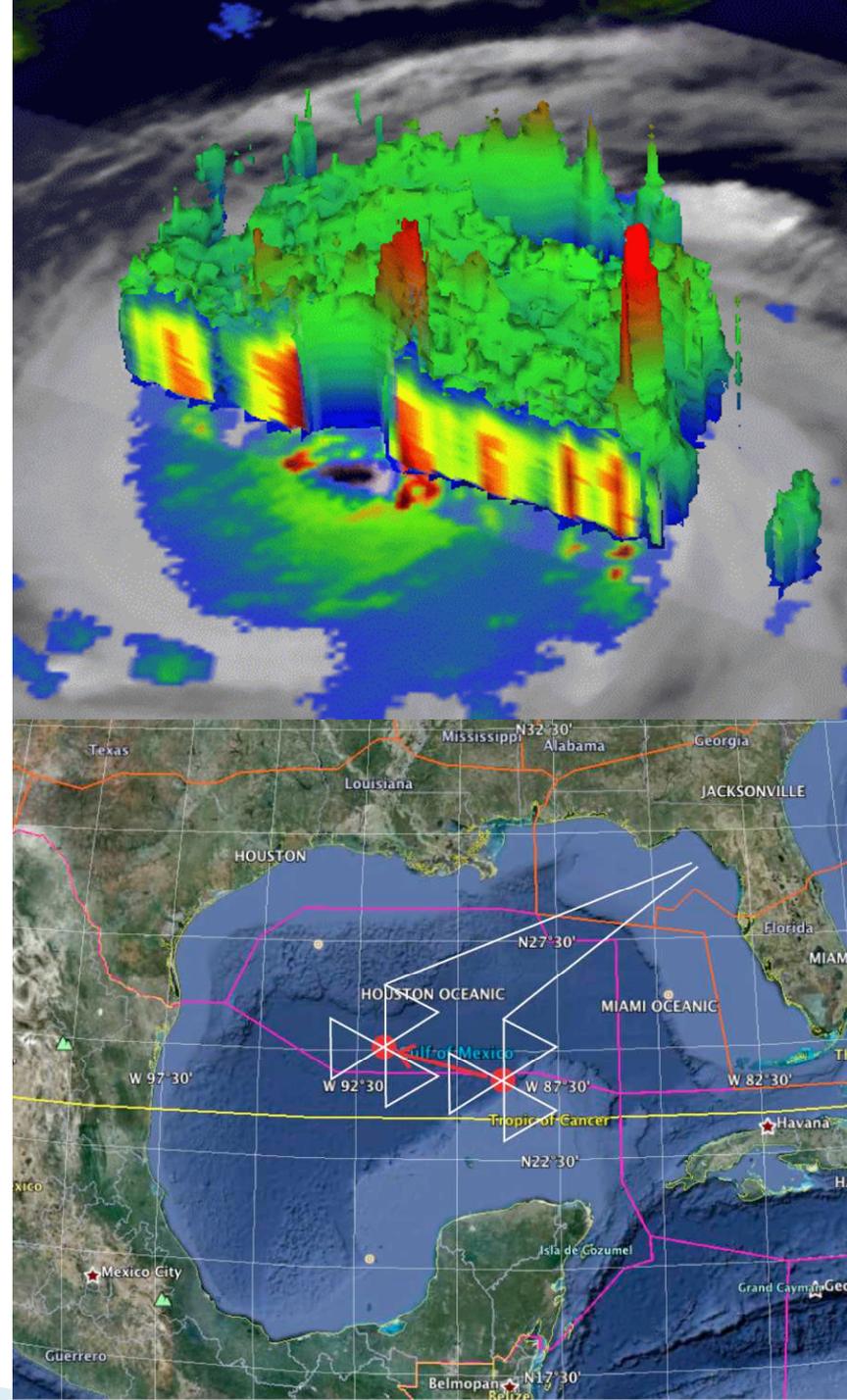


Outflow Layer Studies

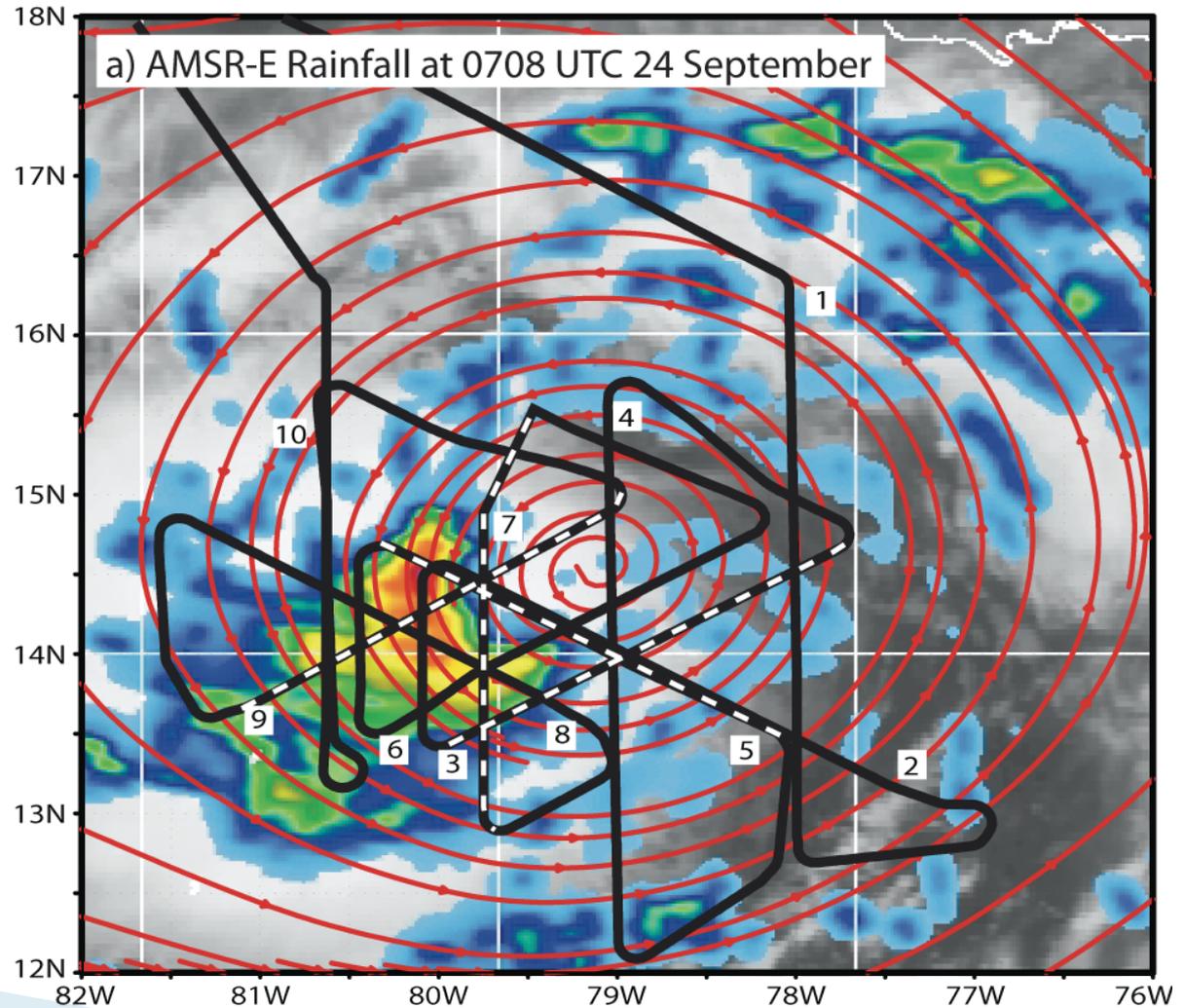


Internal Processes

- Focus on inner-core structure and near environment
- Want frequent repeats over storm center
- Easy to choose crossing headings (e.g., 180, 300, 60°) and leg lengths
- ~1.5 h per pattern for 200–km legs
- 10 patterns in 15–h on station

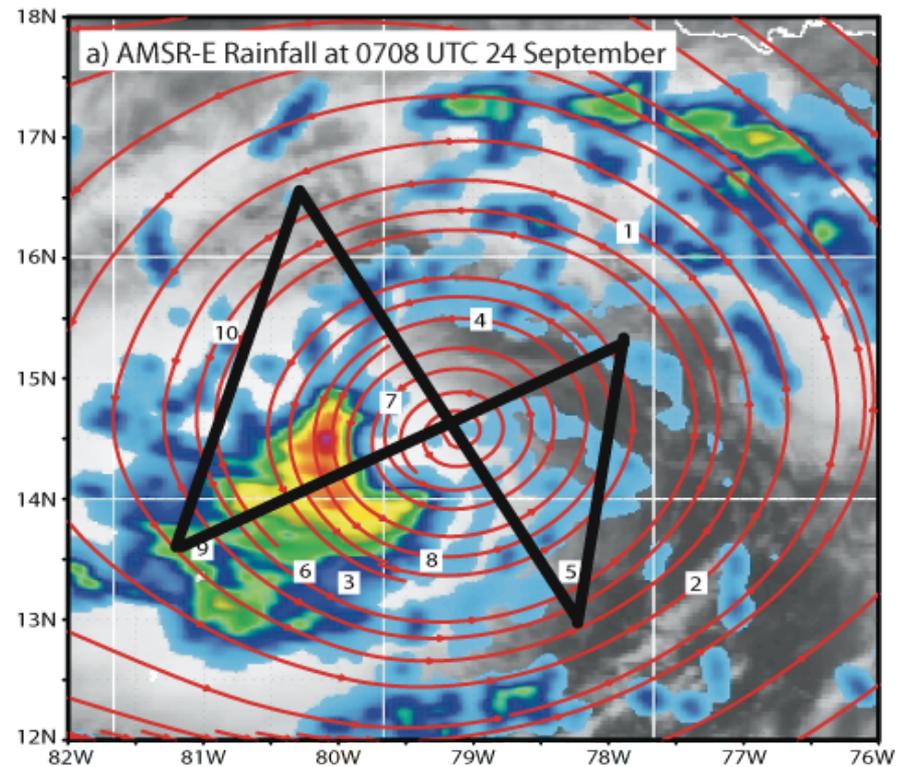
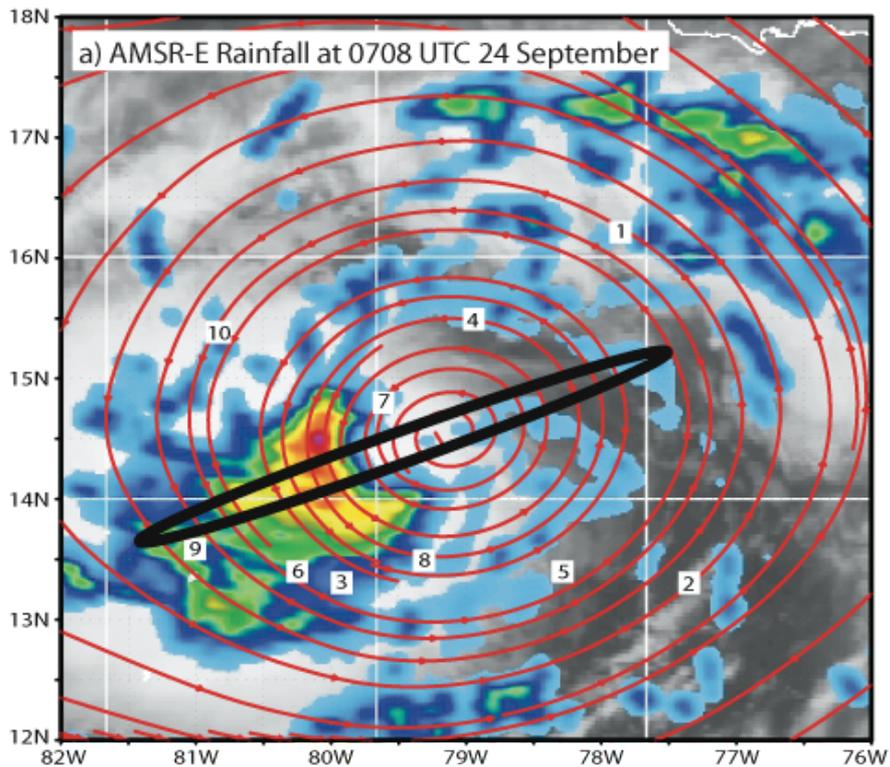


Highly Sheared Storms



Highly Sheared Storms

Align along shear, along and across, or other?

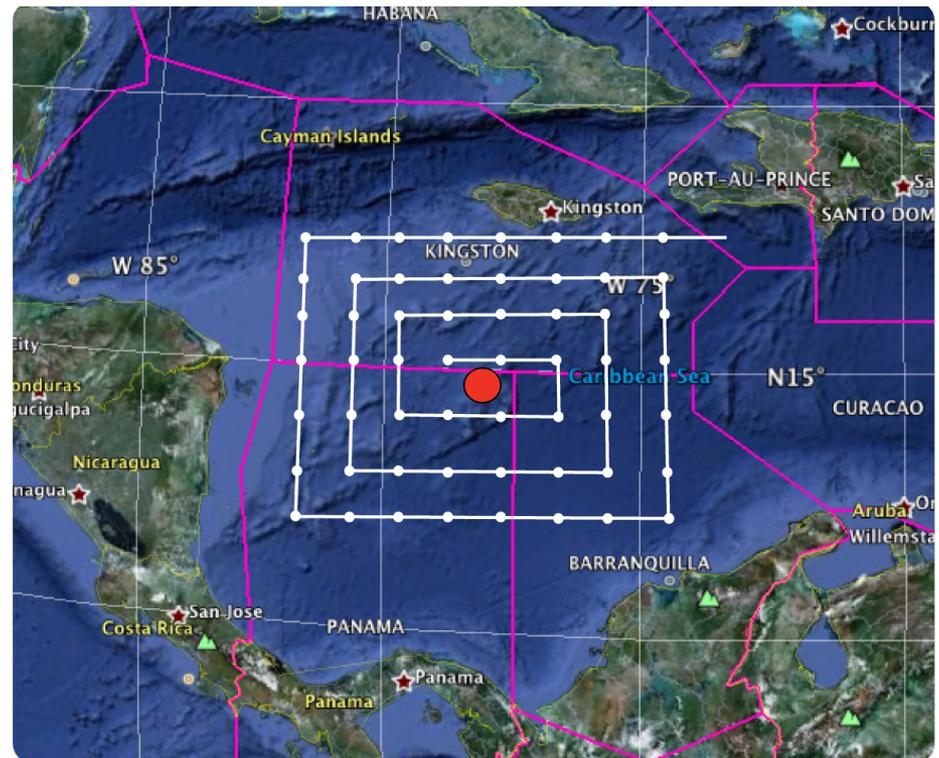


Genesis Theories

- GRIP/PREDICT frequent sampling ideal
- Rely primarily on dropsondes to define wind field
- Dropsondes only possible 1 of every 3 days (at best) in 2012 for HS3
 - Key instruments
 - CPL, S-HIS, AVAPS, TWiLiTE can track intrusions into pouch
 - More dependent on dropsondes than remote sensing
 - Over-storm GH will track intrusion of dry air into inner core region, convective structure and evolution

Marsupial and Top-Down/Bottom-Up Theories

- Depending on pattern size and storm location, might be able to get two patterns into one flight
- Would not be repeated for two days



Extratropical Transition

- Is main goal focused on precipitation or thermo-dynamic structure?
- Moving with the system, where should observations be concentrated and what type of pattern?
- Key challenge is the rapid northward movement

