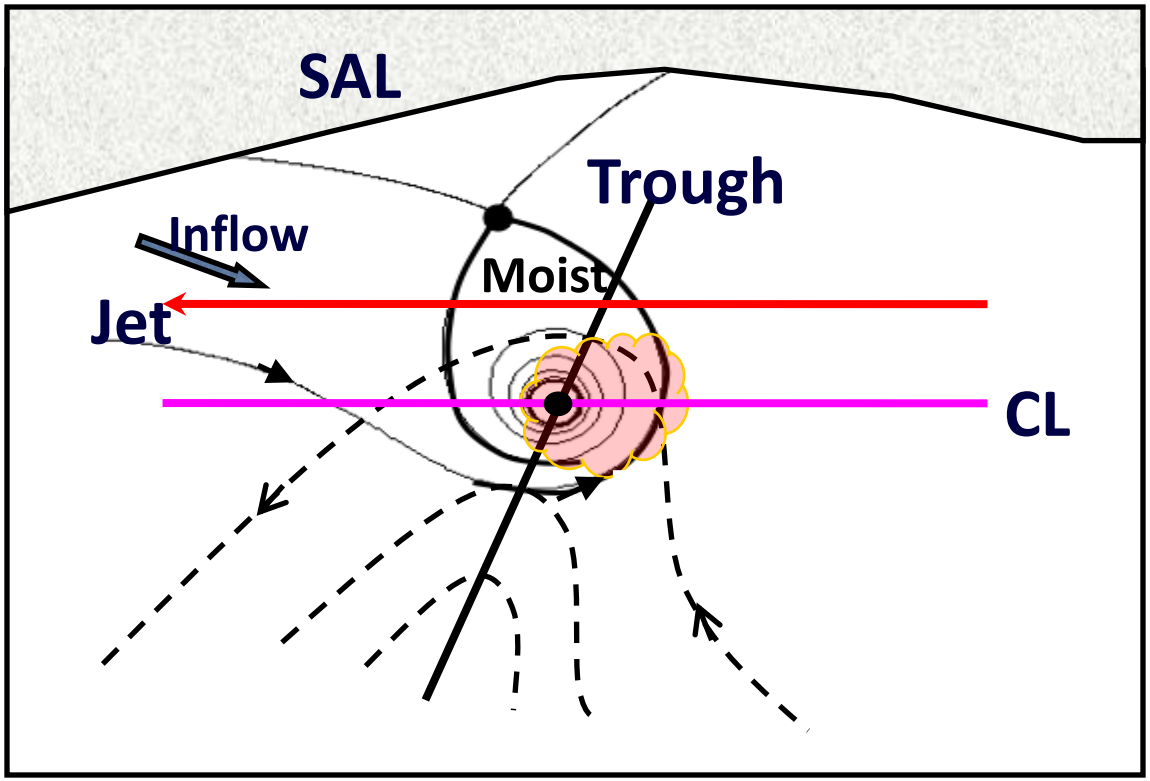
PREDICT

- ***PREDICT*:** PRE-Depression Investigation of Cloud-systems in the Tropics
- ***PREDICT Science Steering Committee***
  - Michael Montgomery, NPS and HRD: Lead PI
  - Lance F. Bosart, University at Albany, SUNY, Albany, NY
  - Christopher A. Davis, NCAR, Boulder, CO
  - Andrew Heymsfield, NCAR, Boulder, CO
  - Michael Bell, NPS
  - Robert Rogers, HRD

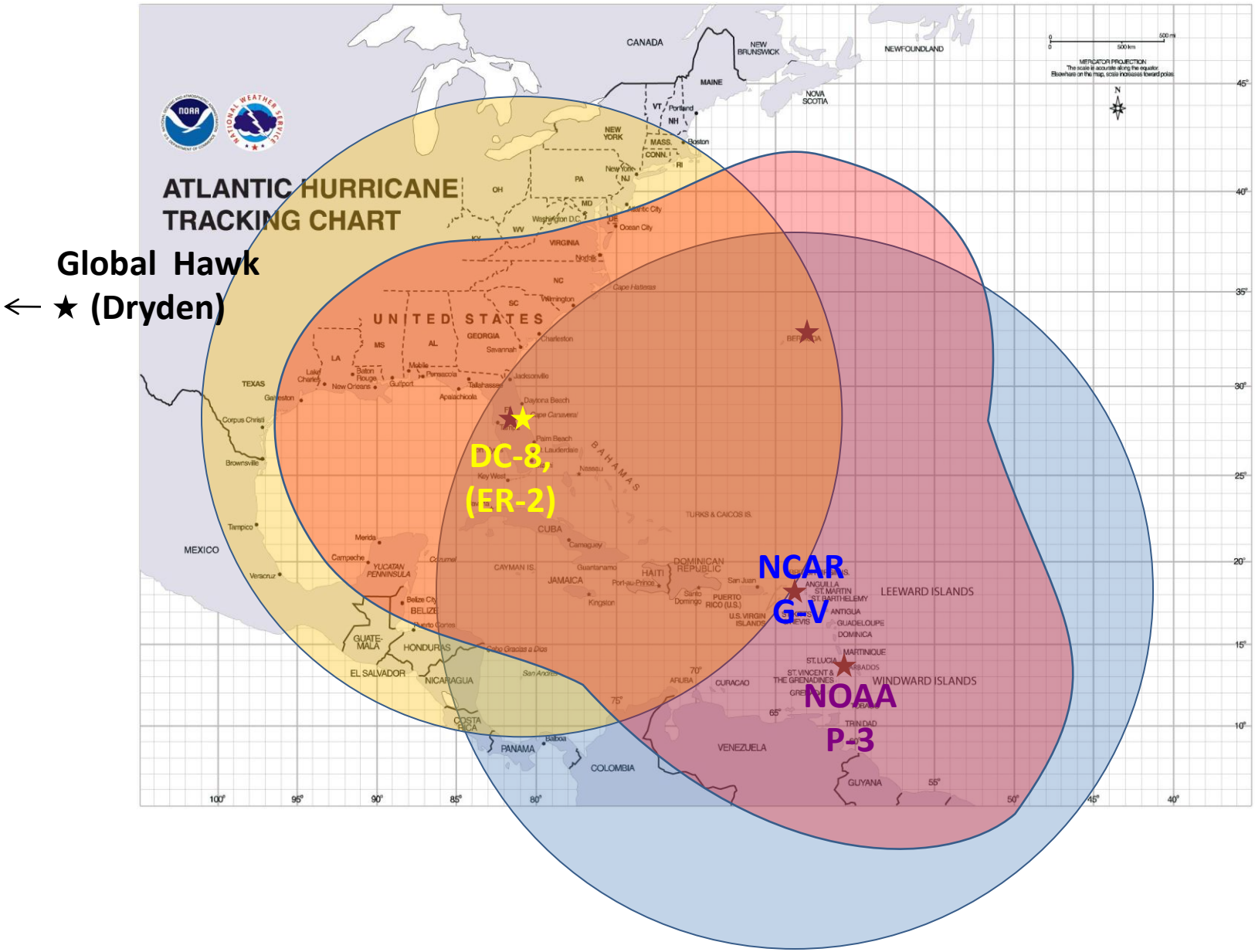
PREDICT Science Foci

Hypothesis: Tropical depression formation is greatly favored in the critical-layer-region of the synoptic-scale, pre-depression wave or subtropical disturbance.



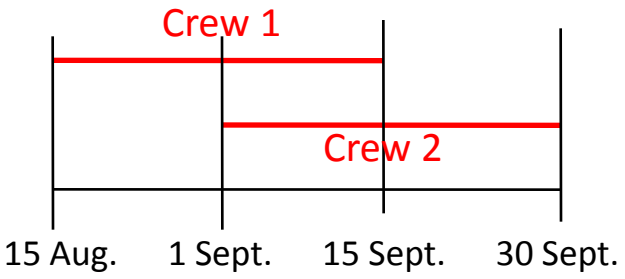
PREDICT Science Interests

- Mesoscale structure of developing and non-developing disturbances
- Tropical transition
- Ice microphysics
- Organized convection and vorticity (NOAA and NASA collaboration)
- Predictability of genesis


ATLANTIC HURRICANE
TRACKING CHART
Global Hawk
← ★ (Dryden)
DC-8,
(ER-2)
NCAR
G-V
NOAA
P-3
UNITED STATES
CANADA
MEXICO
CUBA
BAHAMAS
JAMAICA
HAITI
DOMINICAN REPUBLIC
PUERTO RICO (U.S.)
LEEWARD ISLANDS
WINDWARD ISLANDS
VENEZUELA
COLOMBIA
PANAMA
COSTA RICA
NICARAGUA
HONDURAS
EL SALVADOR
GUATEMALA
BELIZE
YUCATAN PENNINSULA
TEXAS
GEORGIA
VIRGINIA
NEW YORK
MAINE
NEW BRUNSWICK
NOVA SCOTIA
NEWFOUNDLAND
TURKS & CAICOS IS.
CAYMAN IS.
ARUBA
CURACAO
TRINIDAD
GUYANA
MERCATOR PROJECTION:
"The scale is accurate along the equator. Elsewhere on the map, scale increases toward poles."

PREDICT Instruments and Logistics

- 15 August – 30 Sept. 2010
- Base: St. Croix, U.S. Virgin Islands
- NCAR G-V: 200 research hours
- 10+ disturbances sampled, 20-25 flights



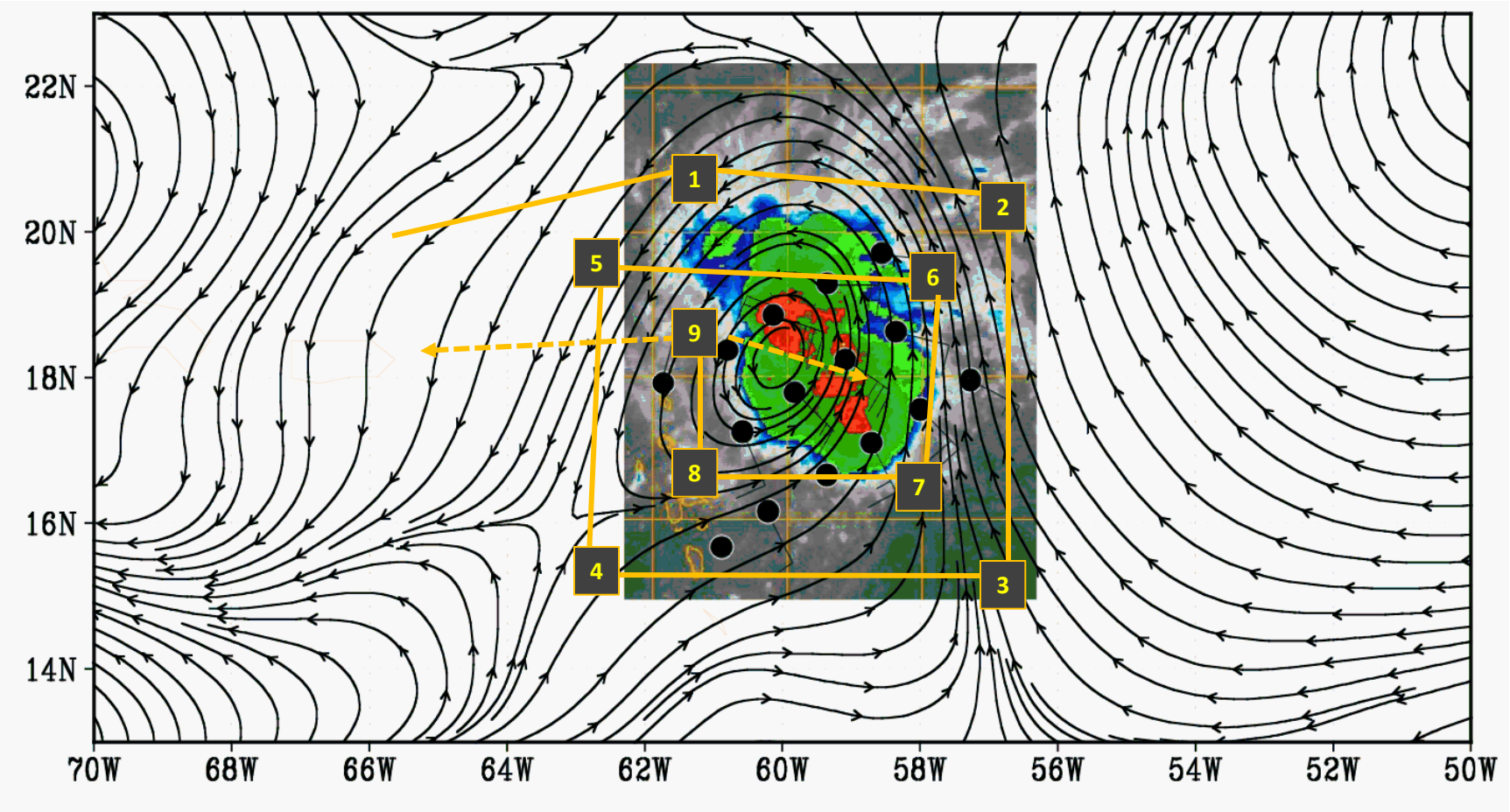
Double-crewed G-V, 1-15 Sept.

Special Cabin Systems:
- GPS Dropsondes
- Counter-flow Virtual Impactor (CVI)
- Ozone Analyzer (fast or other)
- CN Counter
- GPS Water Vapor Profiler (GISMOS) - *tentative*

State Parameters:
- GPS Position & Ground Speed (normal & dGPS)
- IRU Position, Ground Speed, & Platform Attitude
- GPS & Pressure Altitude
- Static Pressure
- Ambient Temperature
- Dew Point Sensors (2) & TDL Humidity
- 3-D Wind Fields
- King Probe Liquid Water Content
- RICE – Super Cooled LWC
- Fwd Digital Video Recording (1 image per sec)

Wing Pods:
- Microwave Temperature Profiler (MTP)
- Small Ice Detector (SID-II)
- Cloud Droplet Probe (CDP)
- Aerosol Probe (UHSAS)
- 25um-2DC Particle Probe
- Cloud Particle Imager (3V-CPI) – *tentative*
- 10 um-2DC Probe – *tentative*
- Laser Airspeed Monitor (LAMS-1) – *tentative*
- All Weather Wind Gust Pod – *tentative*

G-V “Square-Spiral” with NOAA

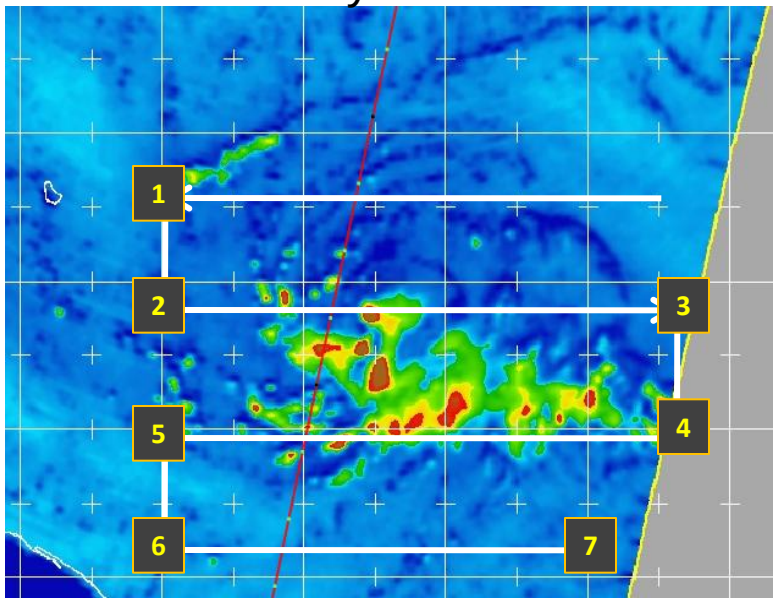
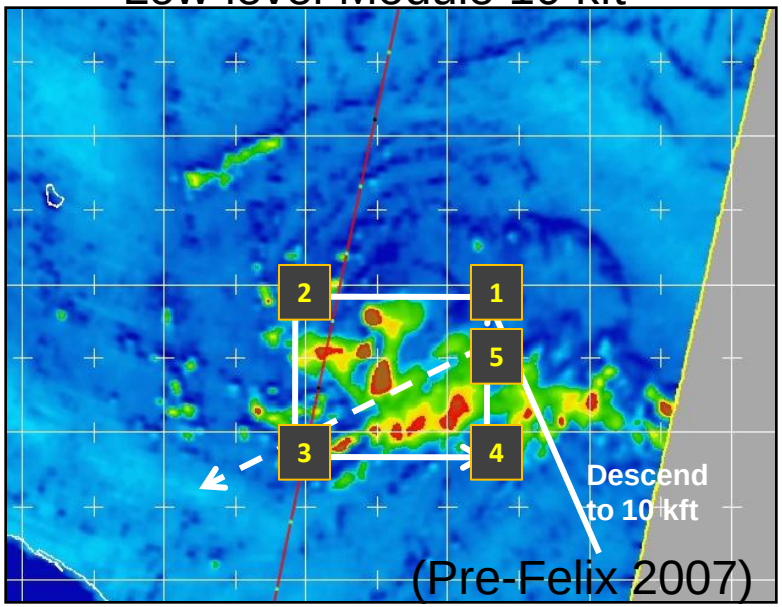
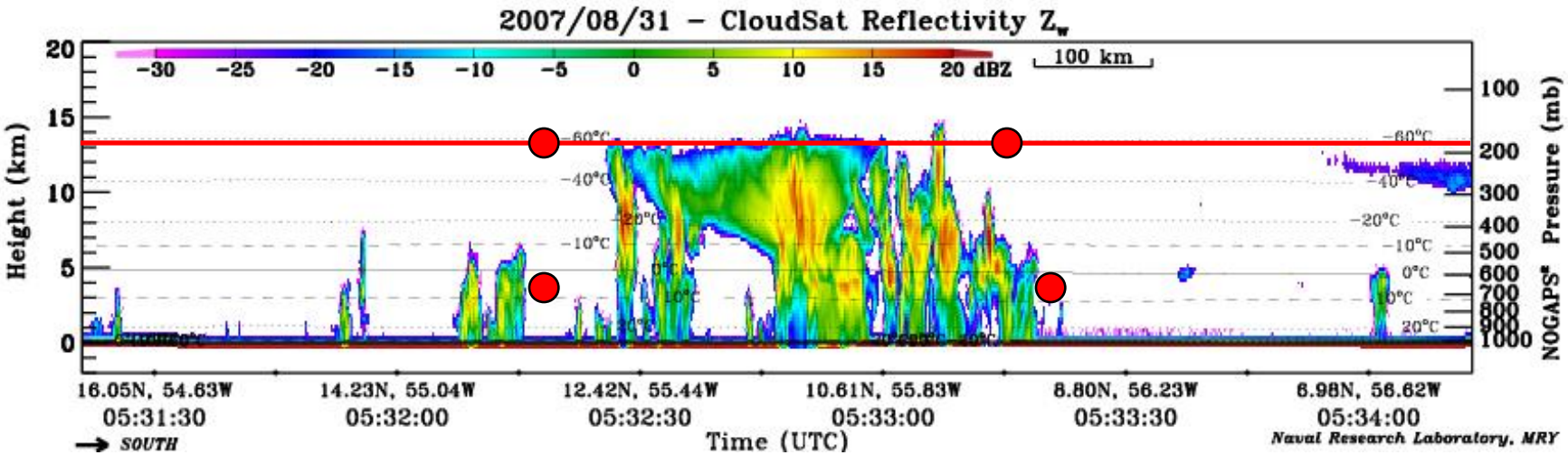


Shading: GOES-IR imagery
Zonally translated 700 hPa streamlines (C~ -6 m/s)

Example (Pre-Felix 2007)

Lawnmower followed by *optional* low-level module

Initial survey 43/29 kft



Low-level Module 10 kft