

## Convective Process Experiment (CPEX) 2017

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### Science objectives:

- Improve understanding of convective processes including cloud dynamics, downdrafts, cold pools and thermodynamics during initiation, growth, and dissipation.
- Obtain a comprehensive set of simultaneous wind, temperature, and moisture profiles in vicinity of deep convection in all phases of convective life cycle.
- Improve model representation of convective and boundary layer processes.

**NASA Convective Processes Experiment**

**About the Mission**

The NASA Convective Processes Experiment (CPEX) aircraft field campaign will take place in the North Atlantic/Gulf of Mexico/Caribbean Ocean region during the early summer of 2017. This campaign hopes to collect data that can help to answer questions about convective storm evolution, organization, growth, and dissipation. For the effort, NASA's DC-8 aircraft will log 100 hours of flight time and be equipped with multiple instruments capable of taking measurements that will help scientists improve their understanding of convective processes.

**CPEX Data Portal**

**Campaign Data Resources**

**The FTP server**

**CPEX Event Calendar**

**Science & Flight Summaries**

**Daily Forecast Reports**

**Quick Look Images**

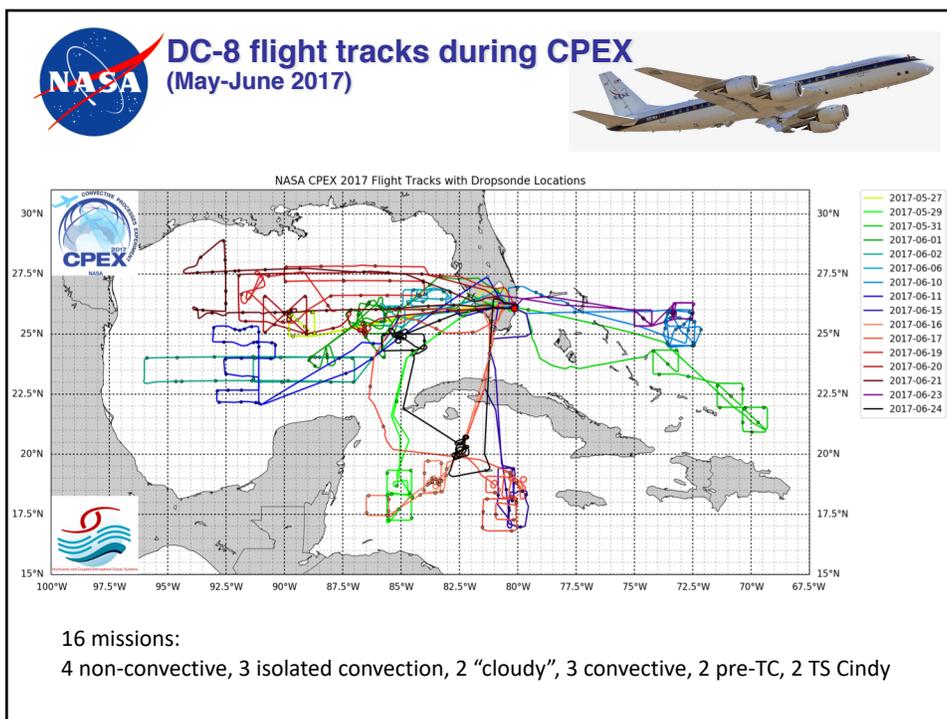
HAMSr data from CPEX now available

Svetla Hristova-Veleva, Brian Knosp, P. Peggy Li, Quoc Vu, F. Joe Turk, Bjorn Lambrightsen, Hui Su, Shuyi Chen, Ed Zipser

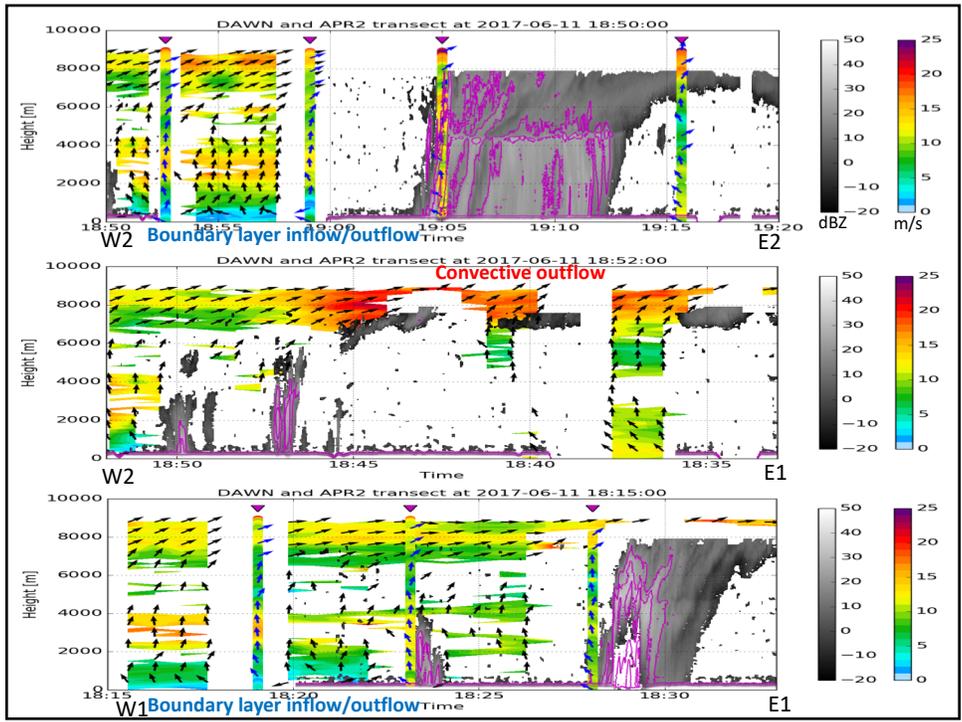
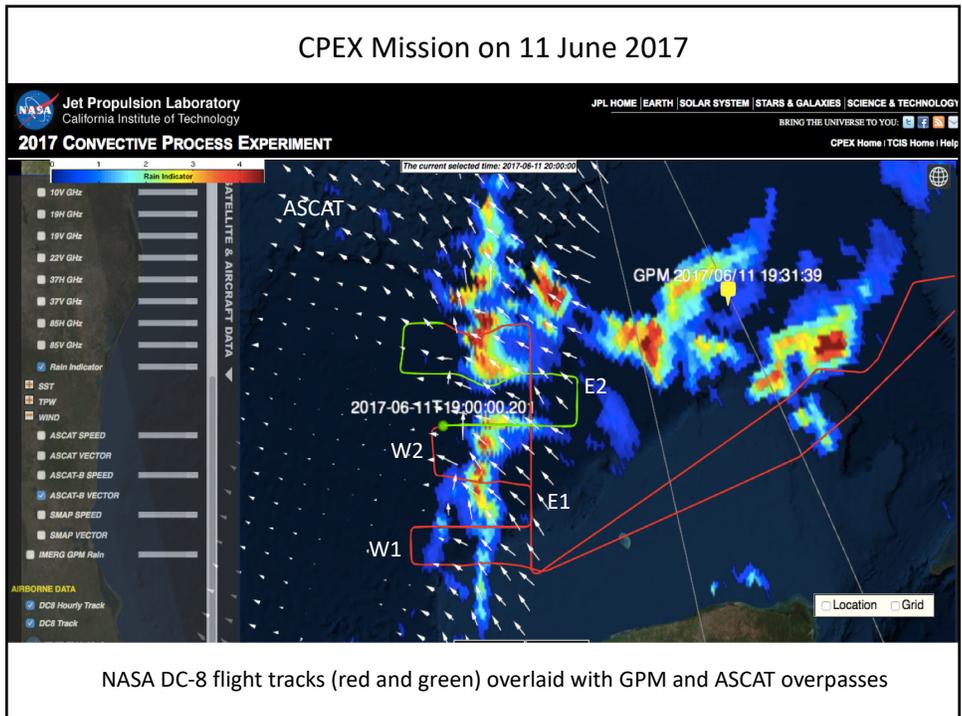
## CPEX Website

<https://cpex.jpl.nasa.gov>

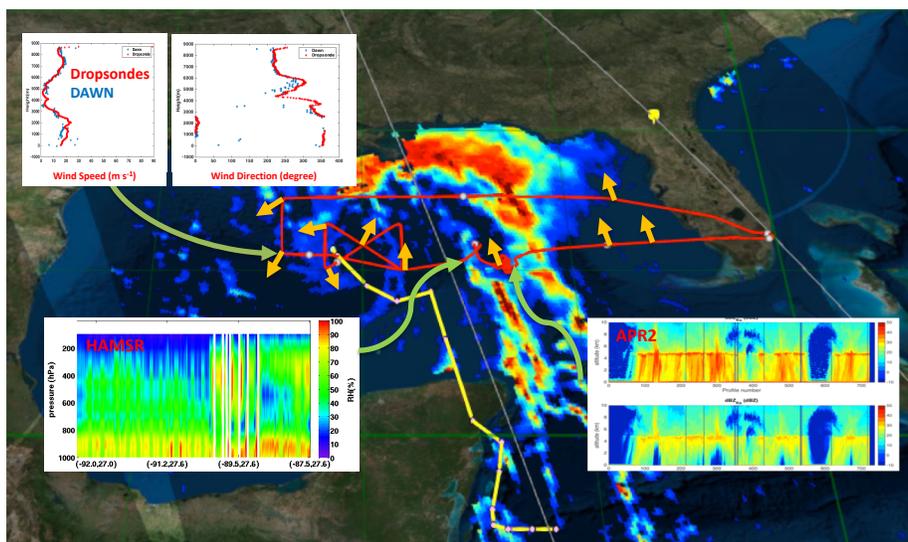
- Served as the official project website, offering the following resources:
  - Event Calendar
  - Flight and Science Summaries
  - Daily Forecast Reports
  - Quicklook Images
  - Information about aircraft and instruments
  - Team contact information and campaign image gallery
  - Gateway to related data resources –
    - **Data Portal** (<https://cpexportal.jpl.nasa.gov>)
    - **FTP server for all observed data and GFS**
    - **Model Forecast pages, etc.**



### CPEX Mission on 11 June 2017



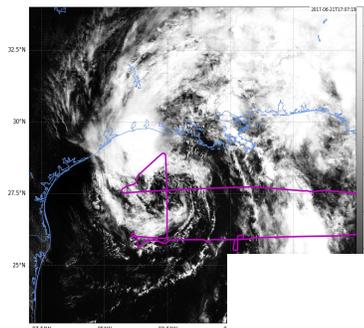
### CPEX Observations of Tropical Cindy (2017) on June 20, 2017



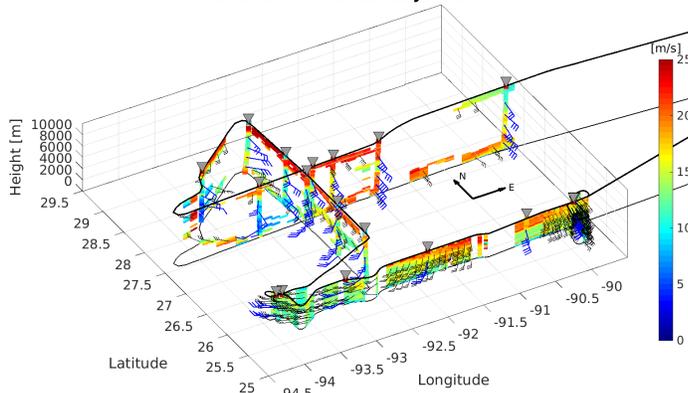
Red curves mark the DC-8 flight path and the color shading is the Rain Index derived from AMSR-2 microwave radiance. The HAMSRS relative humidity and APR2 radar reflectivity curtain plots are along the southern segment of the flight path. Gray lines are GPM overpasses. Orange arrows are DAWN wind vectors at 850 hPa. The agreement between DAWN and dropsondes winds (insets) is very good.

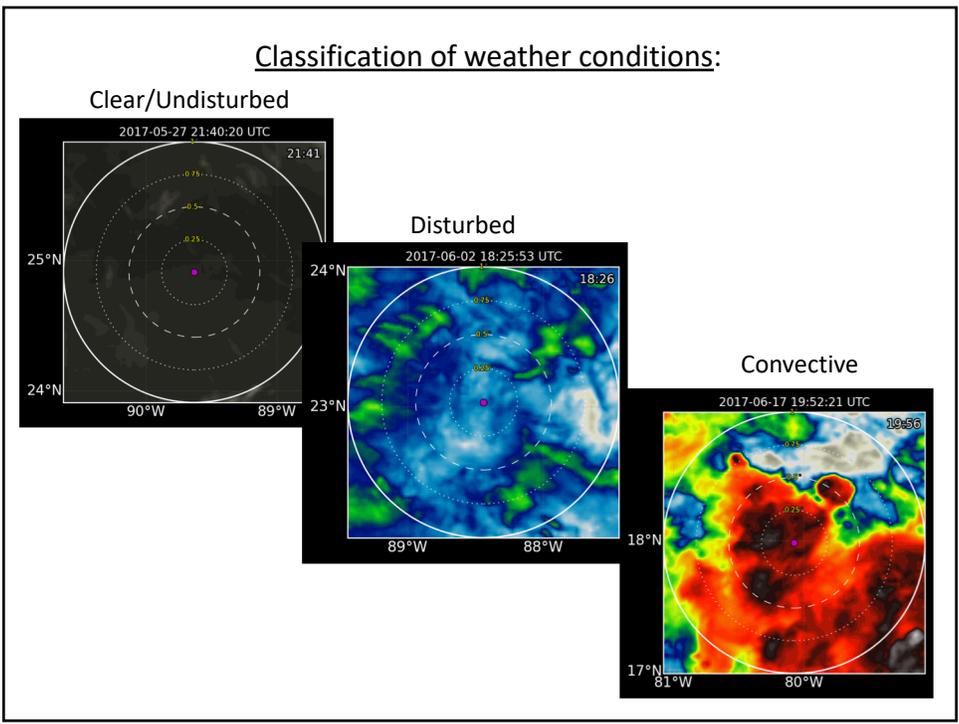
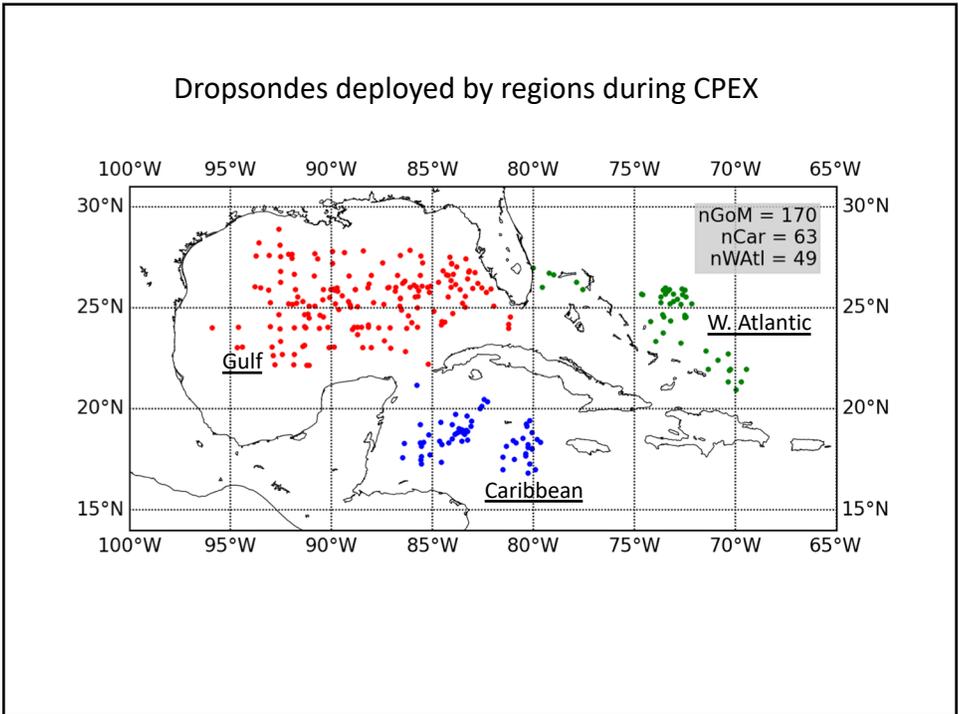
### CPEX Mission on 21 June 2017: TS Cindy

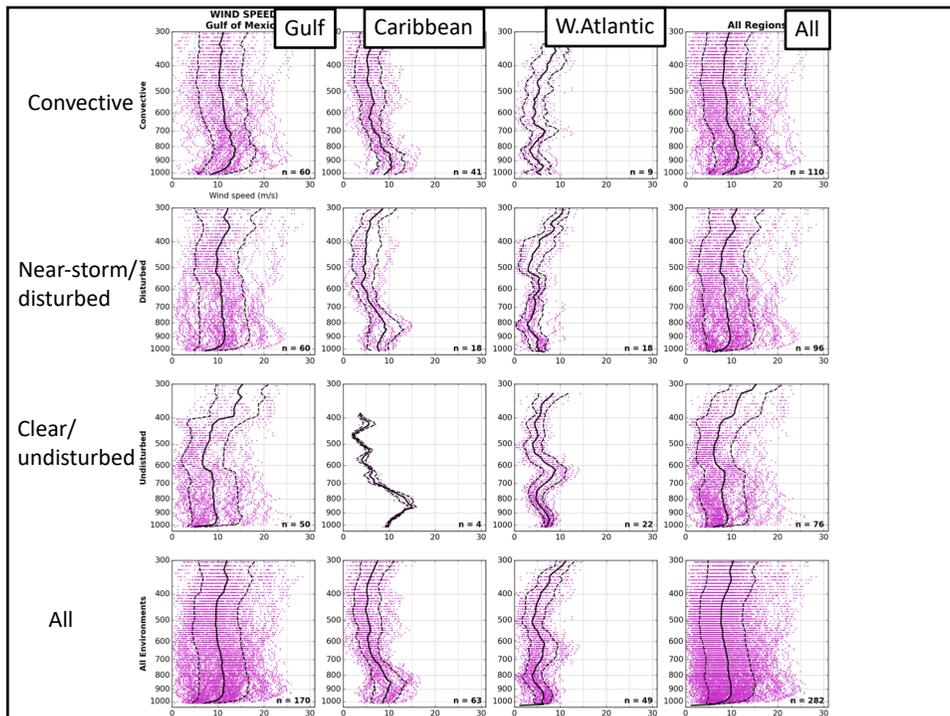
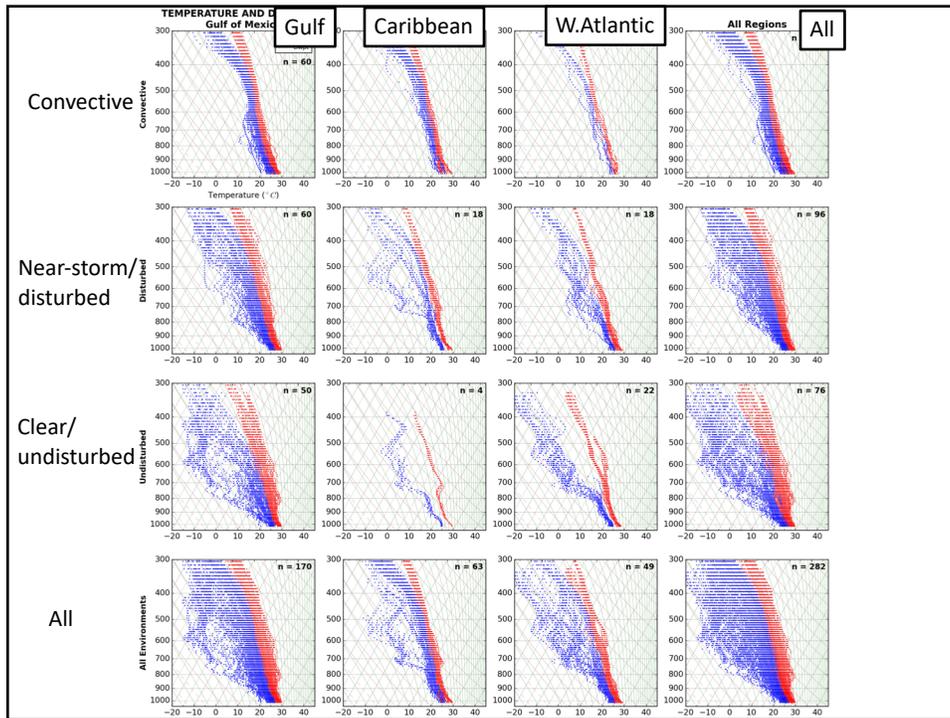
- The 1<sup>st</sup> of its kind observations with DAWN and dropsondes that captured 3D winds and shear in a TC (in Tropical Storm Cindy).

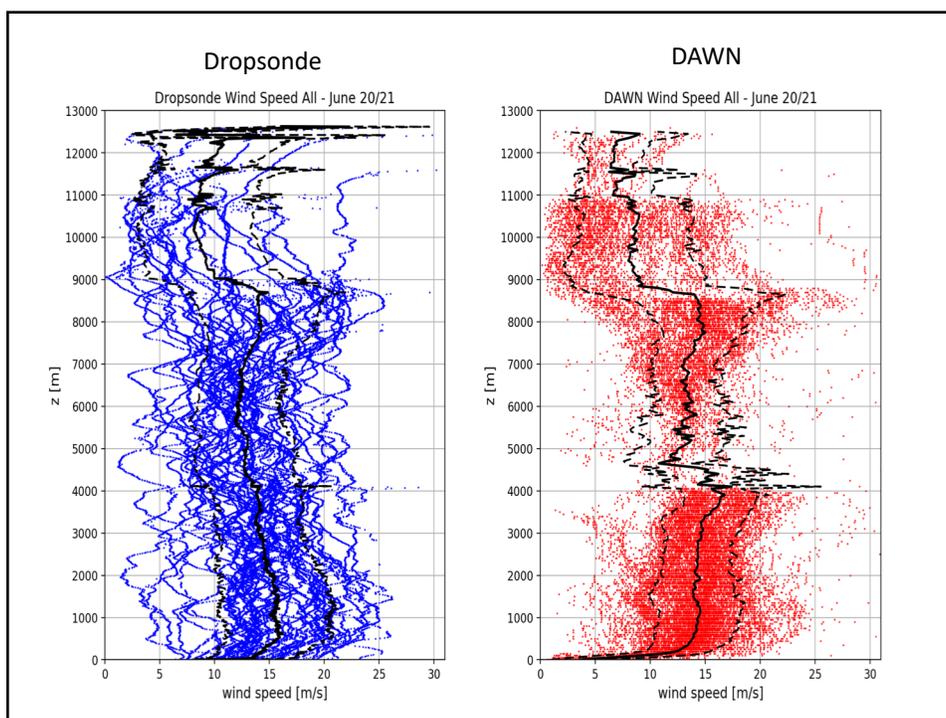


CPEX DAWN Profiles: 21 June 2017









### **Summary:**

- For the first time, wind lidar (DAWN) and dual-frequency precipitation radar (APR2) measurements captured convective structure and near-storm winds including convective in/out flow in the boundary layer and above the convection on June 11.
- First of its kind observations of a tropical storm development from pre-tropical disturbance in the Caribbean Sea, to tropical depression, and formation of Tropical Storm Cindy in the Gulf of Mexico from June 15-21. It also captured 3D winds and vertical wind shear in Cindy.
- Sixteen DC-8 aircraft missions from 27 May-24 June covered a wide range of weather conditions, which provide observations in convection, near-storm/disturbed, and undisturbed conditions.