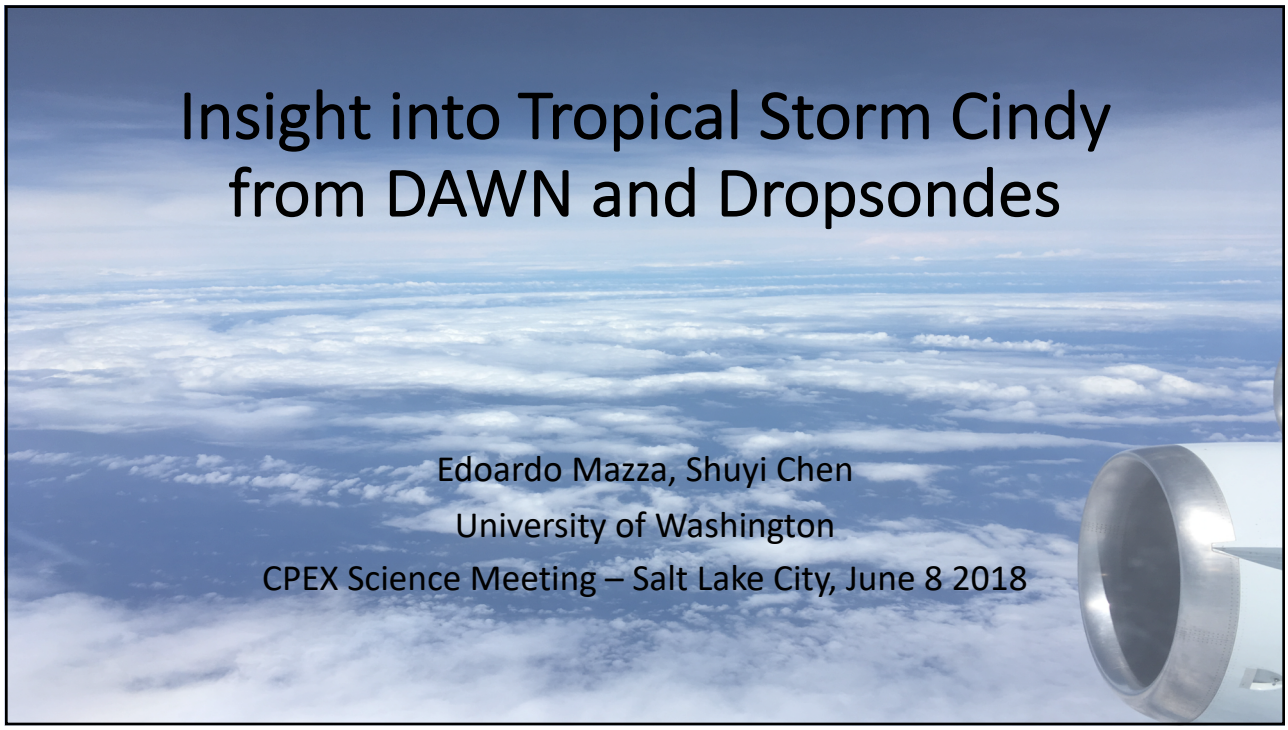
Insight into Tropical Storm Cindy from DAWN and Dropsondes



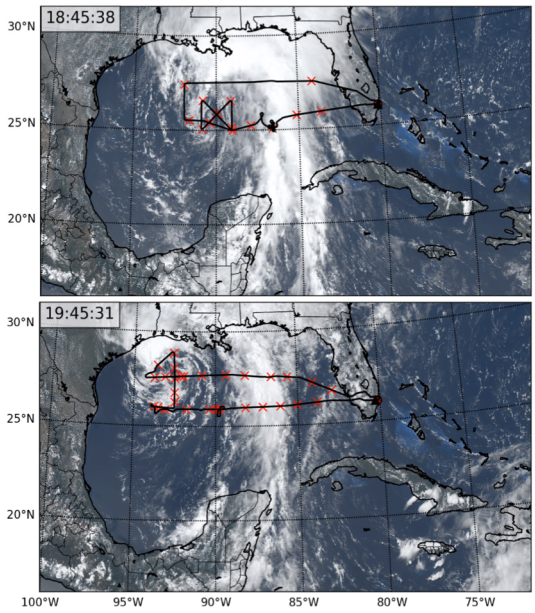
Edoardo Mazza, Shuyi Chen
University of Washington
CPEX Science Meeting – Salt Lake City, June 8 2018

Outline

- Intro
- Flights overview
- DAWN contributions
  - Increase Sampling
  - Storm structure
  - Low-level center location
- DAWN vs Dropsondes in high-winds

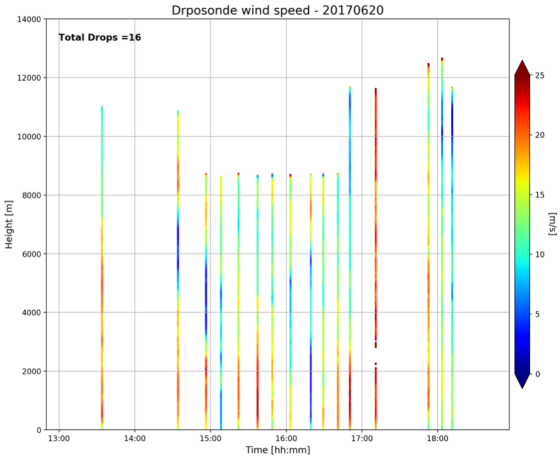
TS Cindy Flight Summary

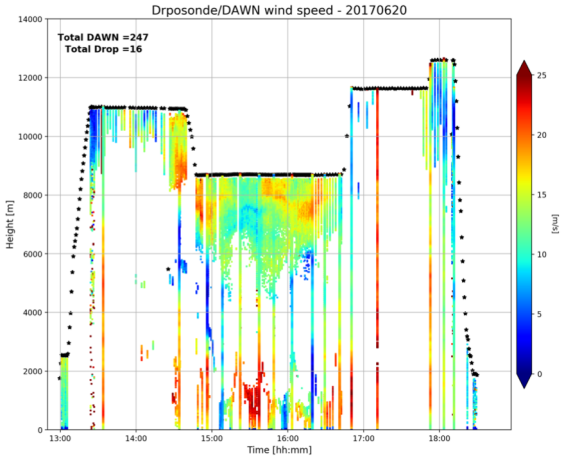
- June 20th, June 21st flights
- ~12 total hours
- Aircraft altitudes 4-12.5 Km
- 47 dropsondes
- 777 DAWN profiles
- Loops



DAWN vs Dropsondes

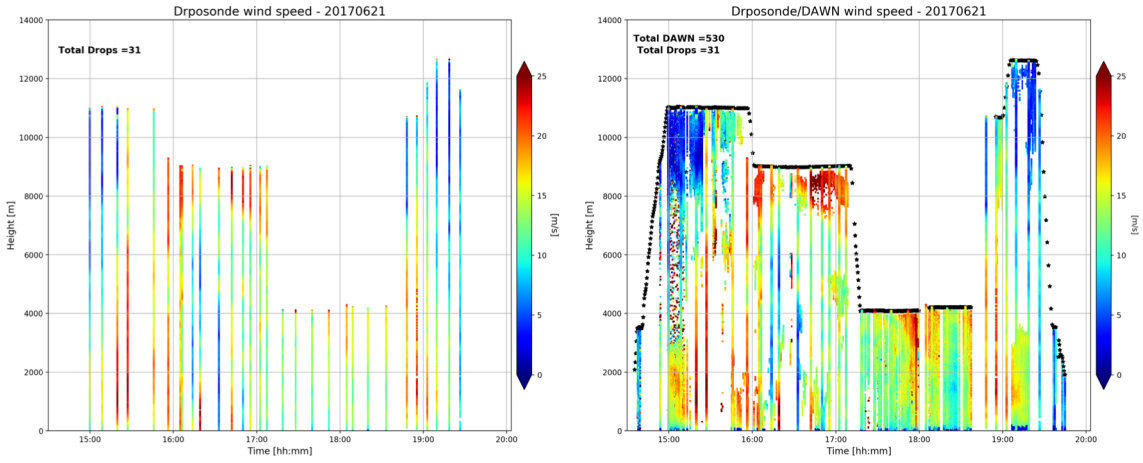
- DAWN version 3 – baseline #0
- Increase sampling – June 20th





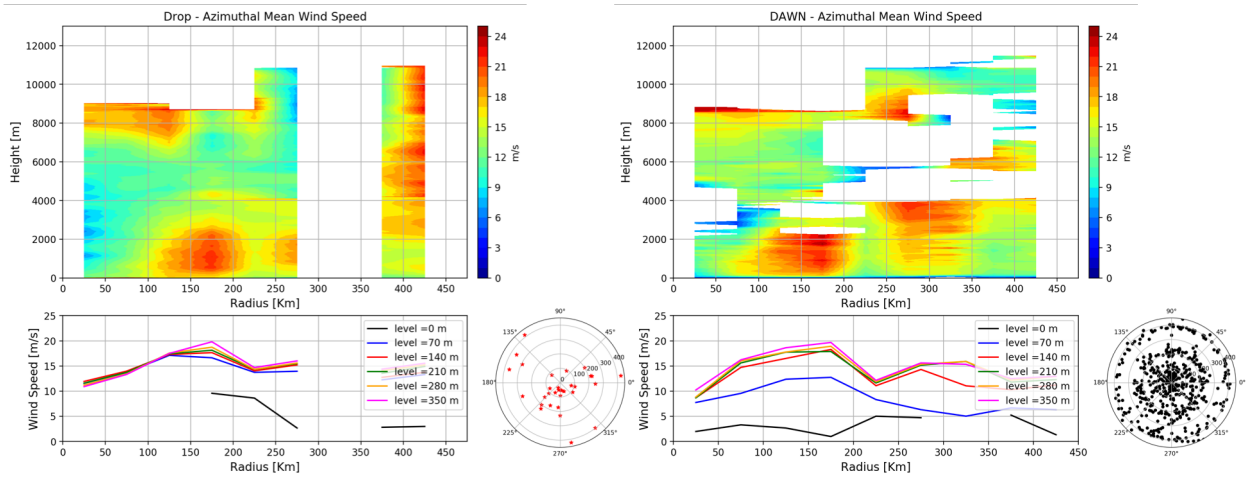
DAWN vs Dropsondes

- Increase sampling – June 21st



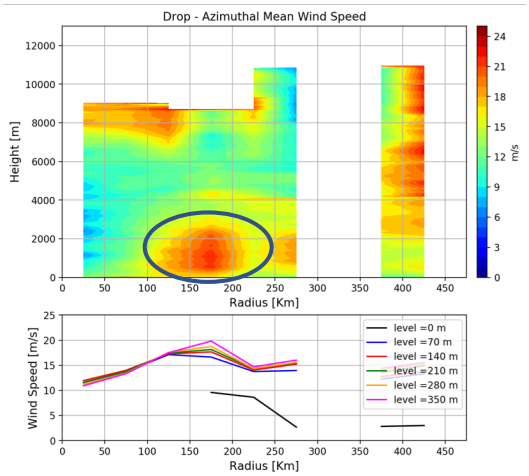
DAWN vs Dropsondes – Axisymmetric Structure

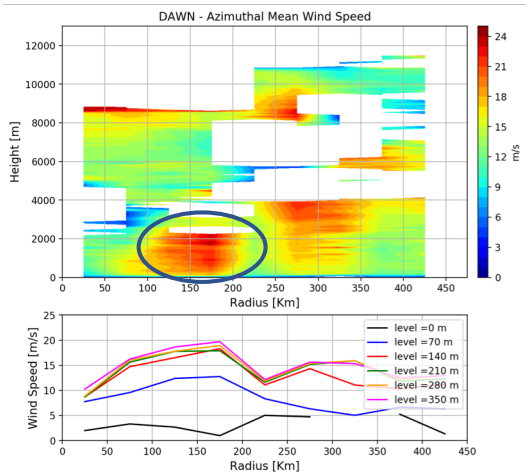
- Azimuthal average in 50-km radial bins
- Distance from 1-hour interpolated best-track data



DAWN vs Dropsondes – Axisymmetric Structure

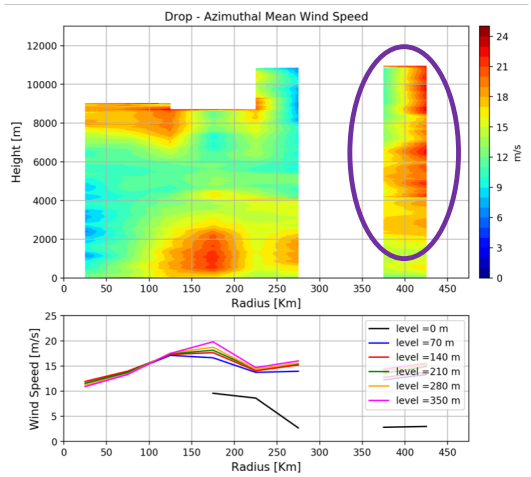
- Low-level wind maximum (~100/200 km)

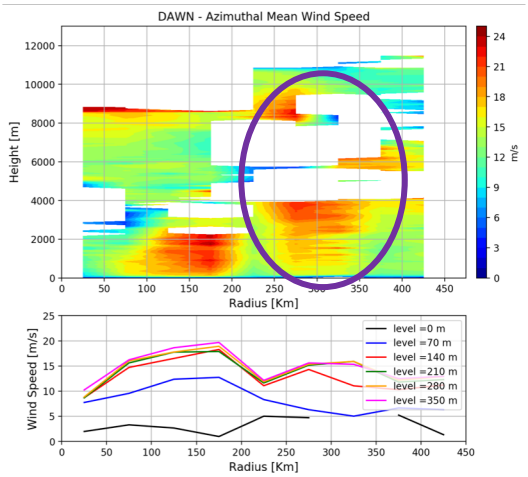




DAWN vs Dropsondes – Axisymmetric Structure

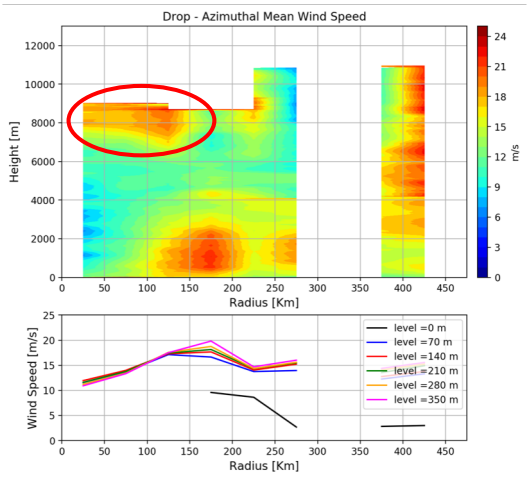
- Outer wind maximum/rainband

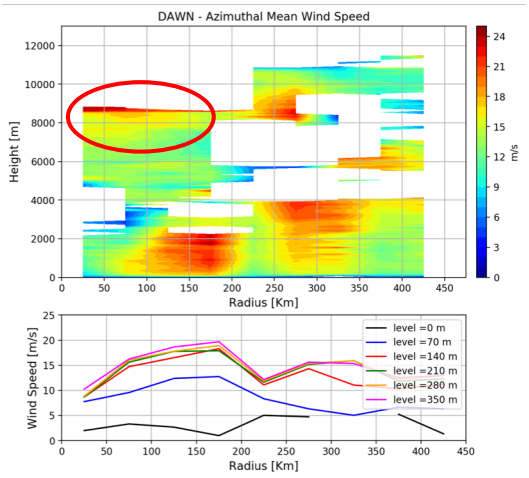




DAWN vs Dropsondes – Axisymmetric Structure

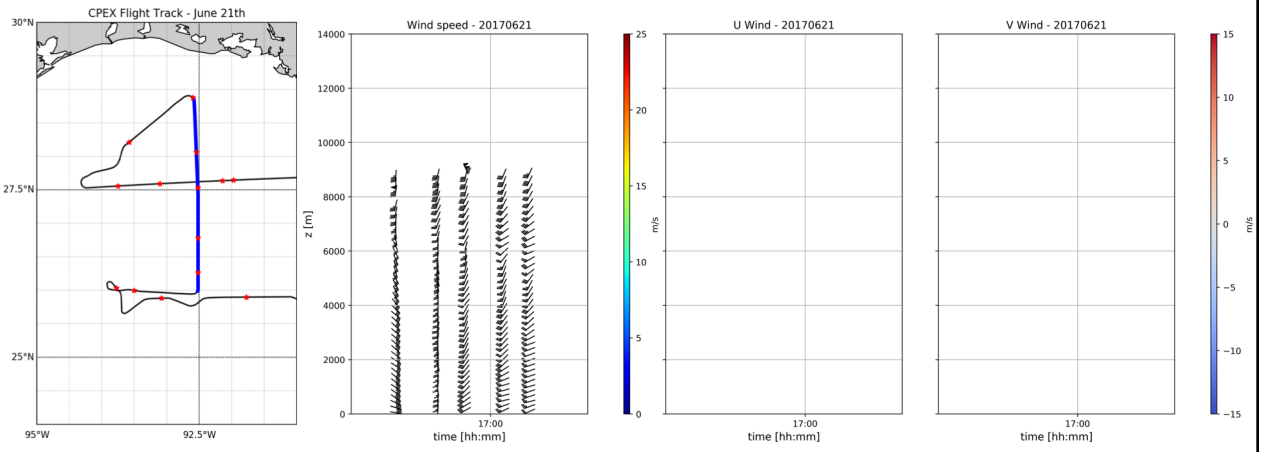
- Upper-level jet





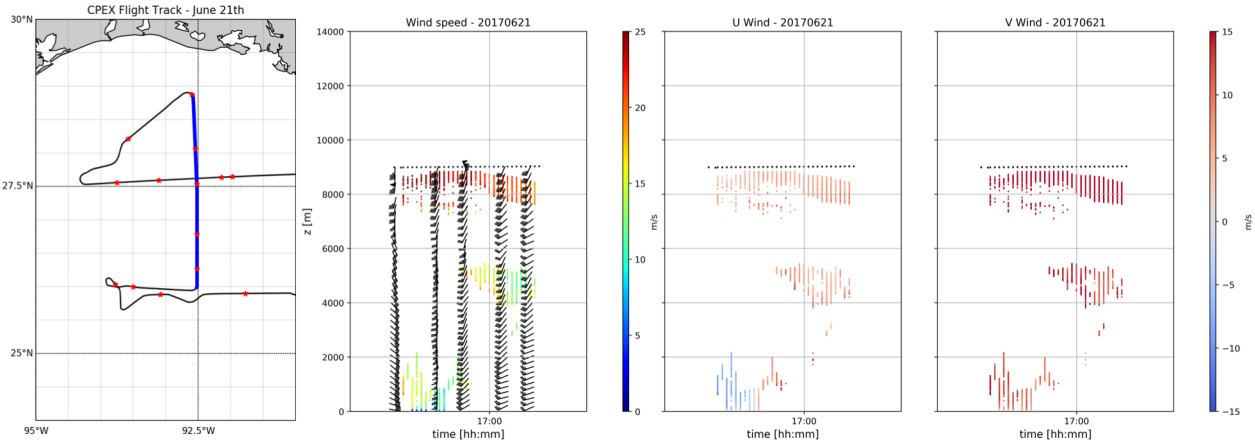
DAWN

- Locating TS Cindy circulation - North/South Cross Section June 21st



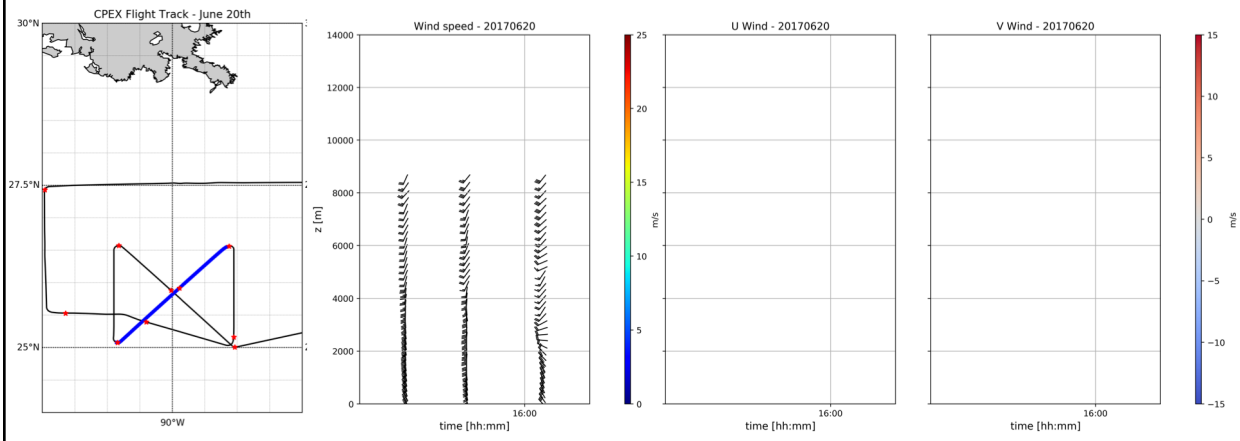
DAWN

- Locating TS Cindy circulation - North/South Cross Section June 21st



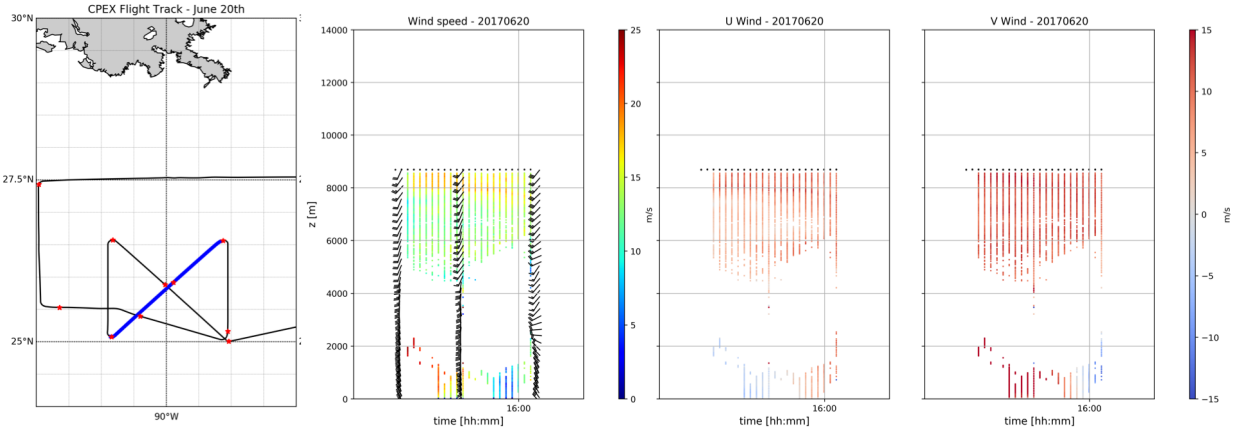
DAWN

- Locating TS Cindy circulation – 1st diagonal June 20th

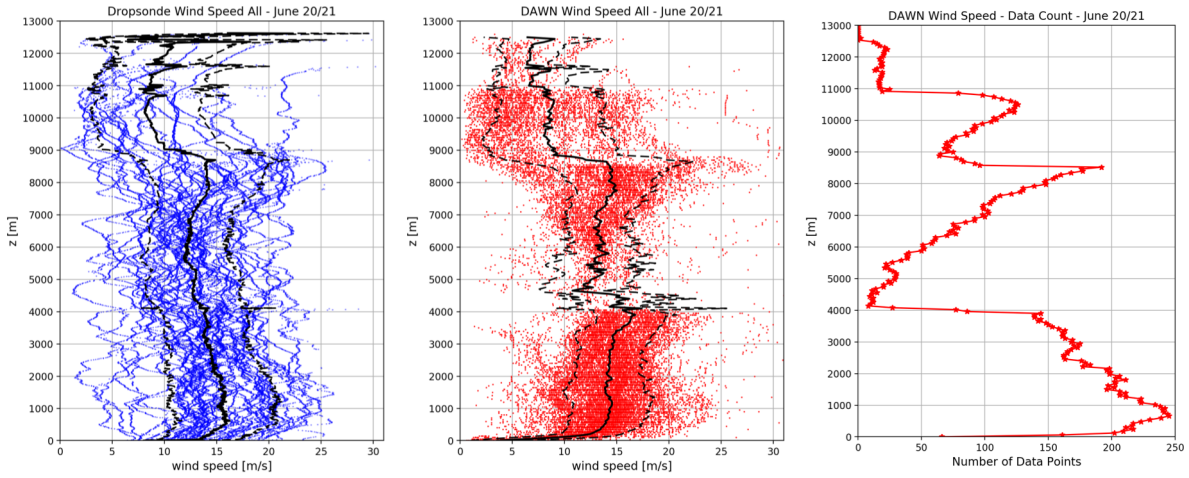


DAWN

- Locating TS Cindy circulation – 1st diagonal June 20th

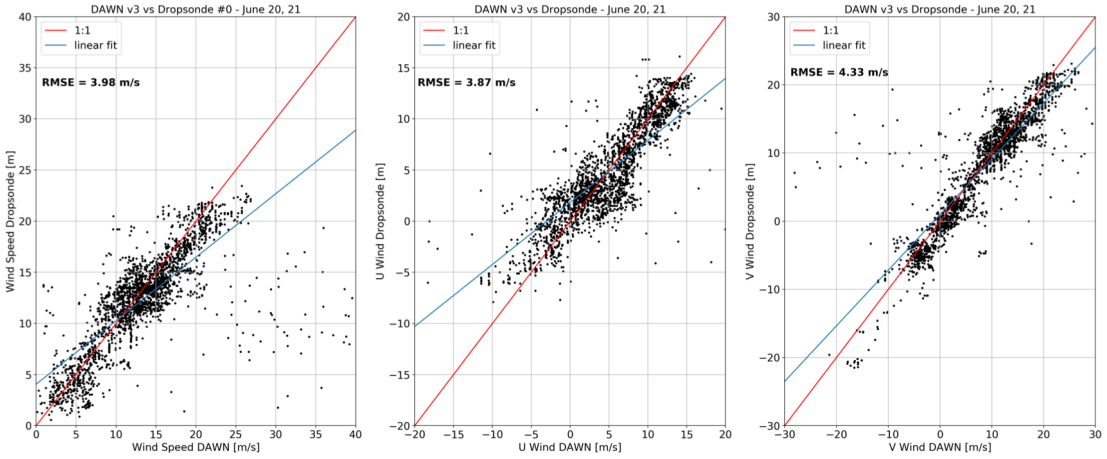


DAWN vs Dropsondes in high-winds



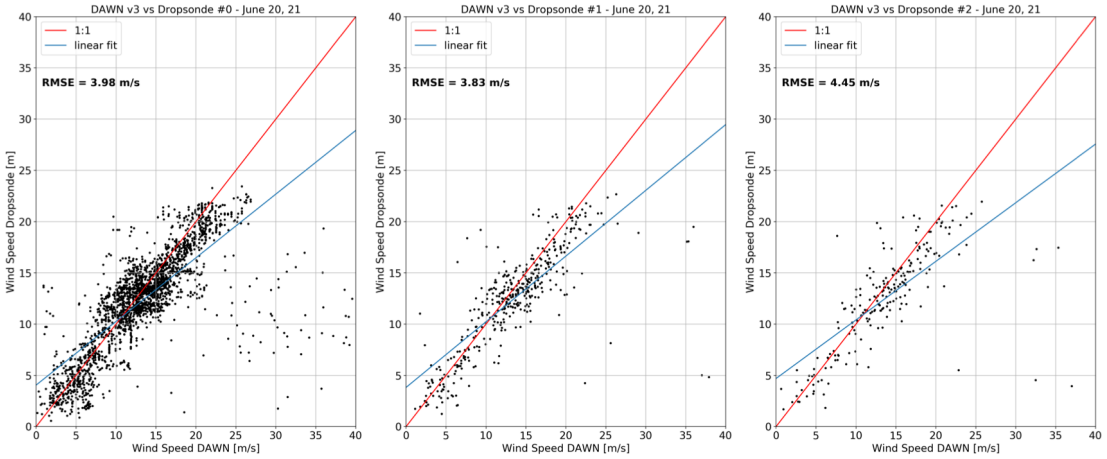
DAWN vs Dropsondes in high-winds

- DAWN and dropsondes interpolated on a regular vertical grid
- Profiles matched in time (< 60 s)
- Data points matched in height (+/- 100 m)



DAWN vs Dropsondes in high-winds

- Baseline and ASIA #1 #2



Take-home

- DAWN and dropsondes generally agree (but differ in details) in moderate/high winds
- DAWN radically increase sampling
- DAWN retrieved TS Cindy axisymmetric structure
- DAWN can help locating low-level center if ‘cloud-free’