Langley Aerosol Research Group (LARGE)
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https://science-data.larc.nasa.gov/large/

LARGE In-situ Cloud Measurements for ACTIVATE

November 2022 Science Team Meeting

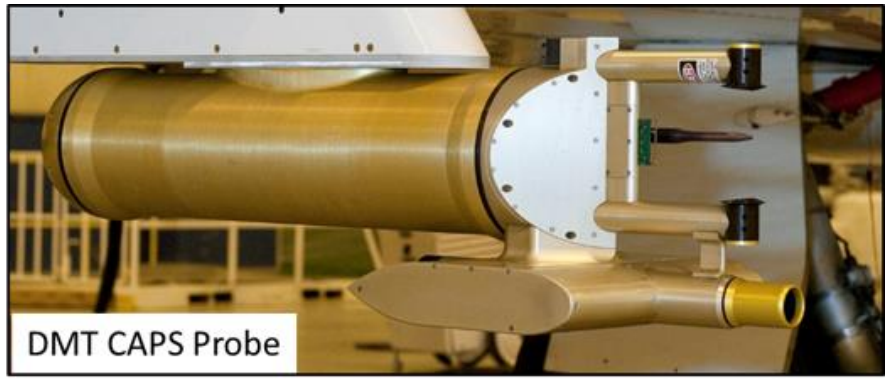
Langley Aerosol Research Group (LARGE) Archived Cloud Parameters:

Cloud Droplet Probe (CDP)

- **Manufacturer Webpage:** Droplet Measurement Technologies (DMT)
- **Size Range:** 2-50 µm diameter
- **Archived Geophysical Variables:**
  - Aerosol and Cloud Droplet Number Size Distribution, cm^{-3}
  - Integrated Aerosol and Cloud Droplet Number, cm^{-3}
  - Liquid Water Content, g m^{-3}
  - Effective Radius, µm
  - Effective Variance, µm

Cloud and Aerosol Spectrometer (CAS)

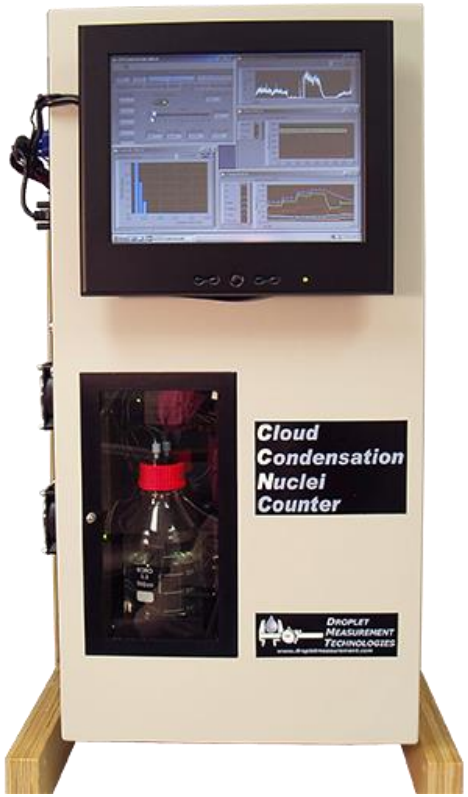
- **Manufacturer Webpage:** Droplet Measurement Technologies (DMT)
- **Size Range:** 0.5-50 µm diameter
- **Archived Geophysical Variables:**
  - Aerosol and Cloud Droplet Number Size Distribution, cm^{-3}
  - Integrated Aerosol and Cloud Droplet Number, cm^{-3}
  - Liquid Water Content, g m^{-3}
  - Effective Radius, µm
  - Effective Variance, µm

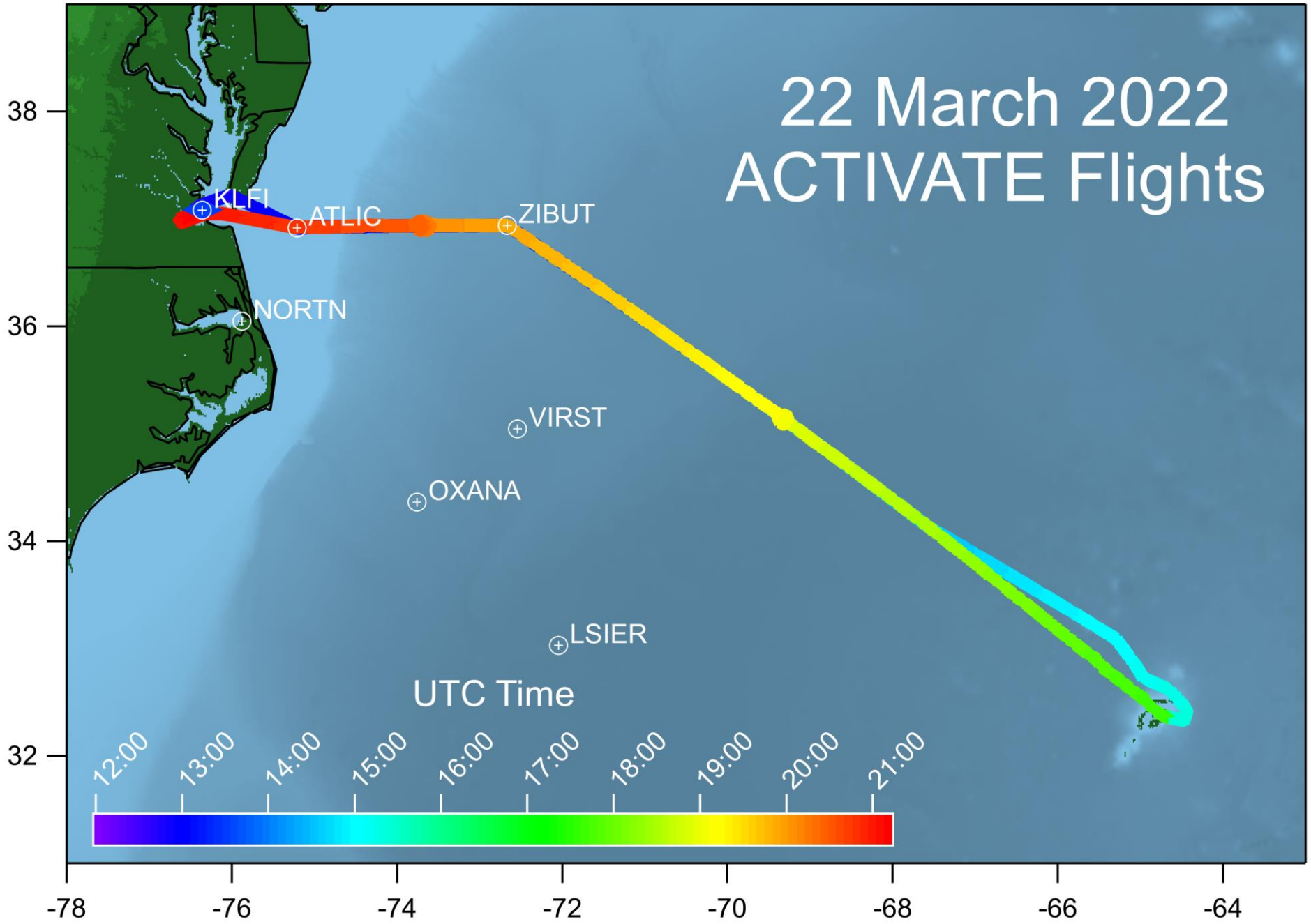


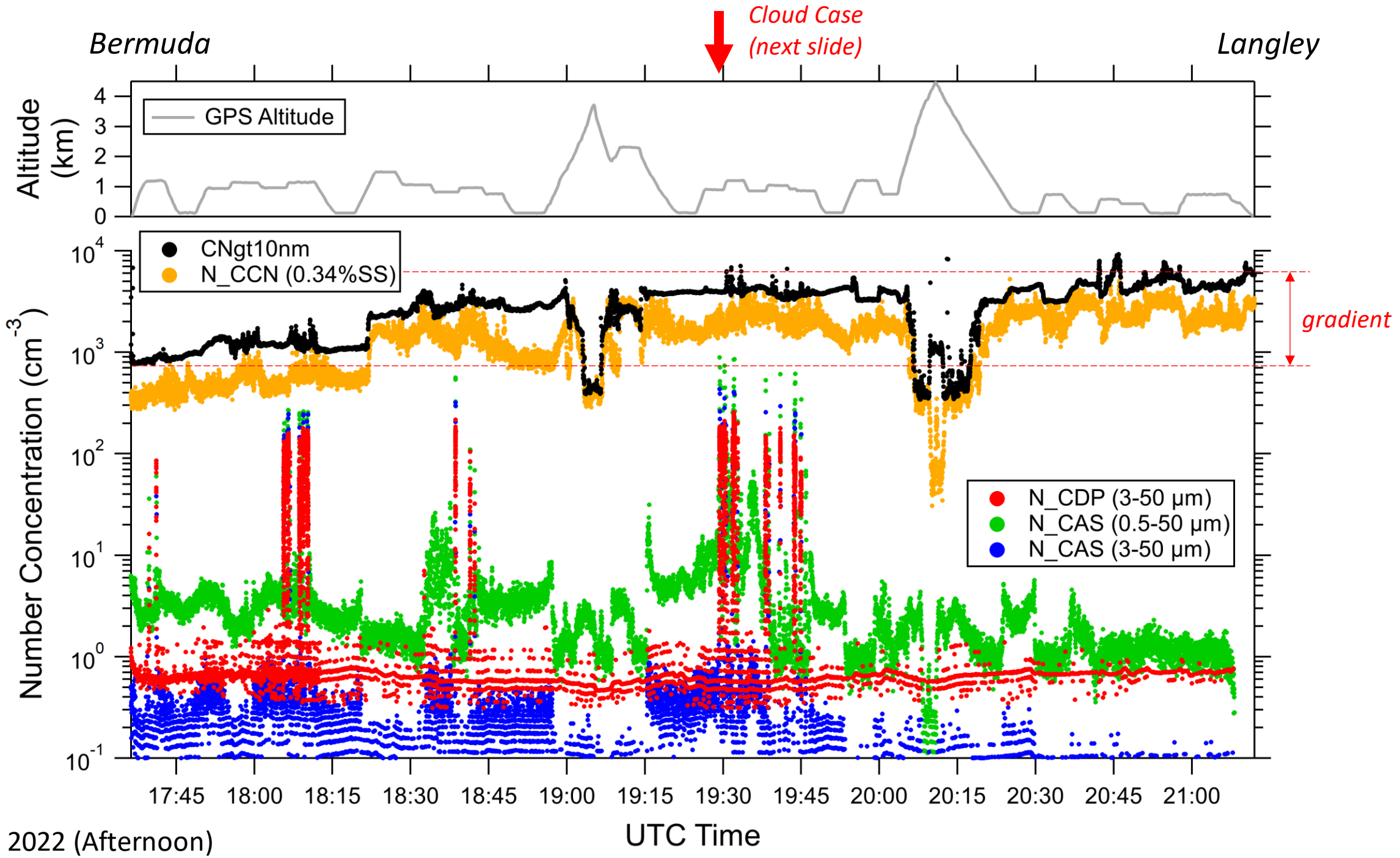
Langley Aerosol Research Group (LARGE) Archived CCN Parameters:

Cloud Condensation Nuclei Counter (CCN-100)

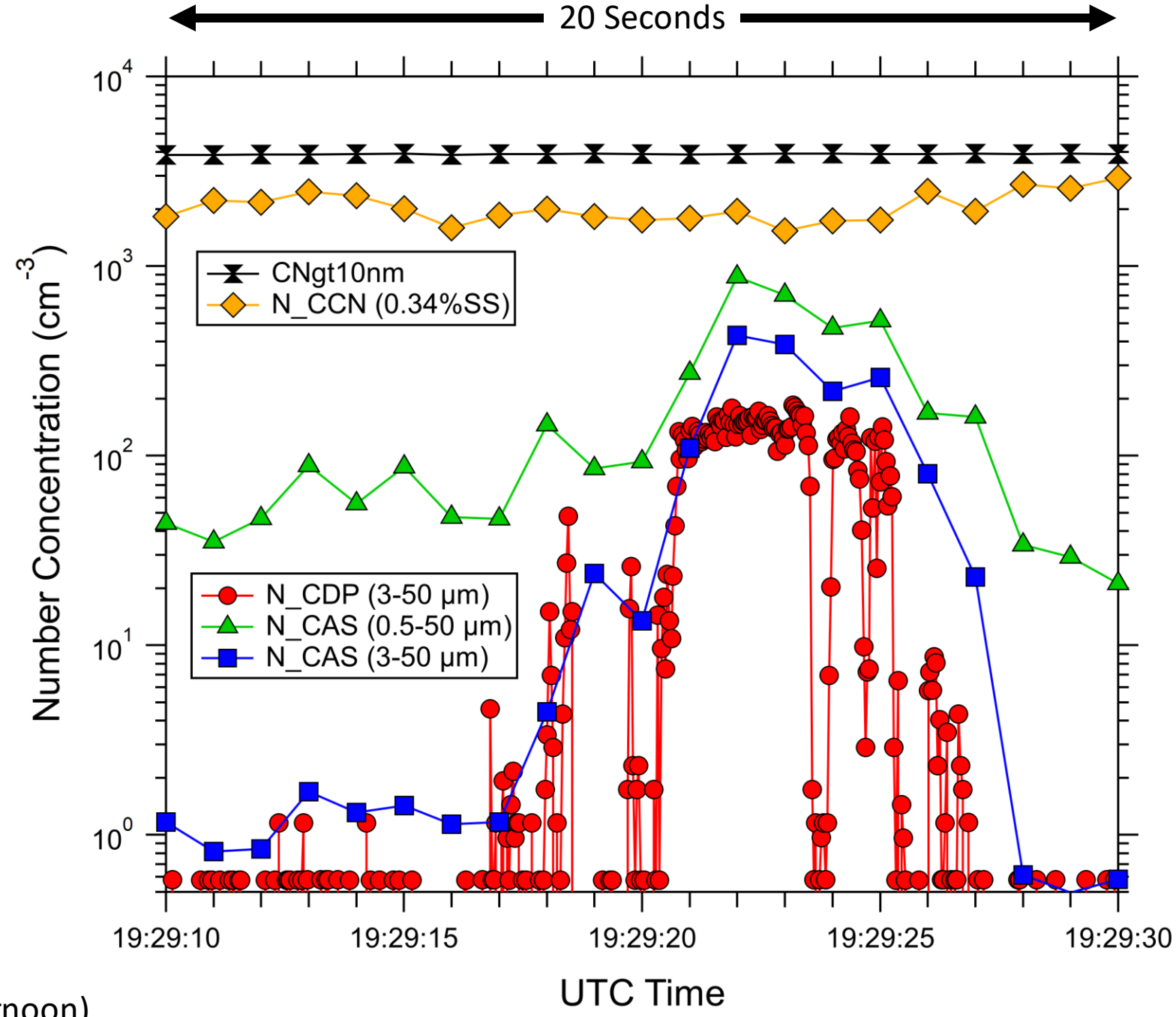
- **Manufacturer Webpage:** Droplet Measurement Technologies (DMT)
- **Archived Geophysical Variables:**
  - Instrument Water Vapor Supersaturation (%)
    *** This is User Defined and is NOT AMBIENT! ***
  - CCN Number Concentration (cm^{-3} STP)




22 March 2022
ACTIVATE Flights
KLFI
ATLIC
ZIBUT
NORTN
VIRST
OXANA
LSIER
UTC Time
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
38
36
34
32
-78
-76
-74
-72
-70
-68
-66
-64



22 March 2022 (Afternoon)



22 March 2022 (Afternoon)

Data Use: Best Practices for ACTIVATE Cloud Data

***** Please read the ICARTT file headers *****

- Number concentrations and size distributions are reported at *ambient* temperature, pressure, and relative humidity.
- The CDP sample volume is computed using a constant sample area of 0.323 mm^2 and the measured aircraft true air speed.
- The CAS sample volume is computed using a constant sample area of 0.25 mm^2 and the measured aircraft true air speed.
- Binned size distribution concentrations are normalized by the log of the bin width (dN/dlogDp).
- Sizing is calibrated assuming the refractive index of water, so differences in the aerosol refractive index for, e.g., coarse-mode dust or sea salt aerosols may lead to sizing biases.
- Generally, the CDP is the best place to start when looking at cloud data. It has several design advantages over the CAS and the sample area is directly measured (less uncertainty).
- CDP is higher resolution than 1 Hz for the later field campaigns (lesson learned from Summer ‘20)

Please contact us for any questions/comments/concerns (michael.shook@nasa.gov)