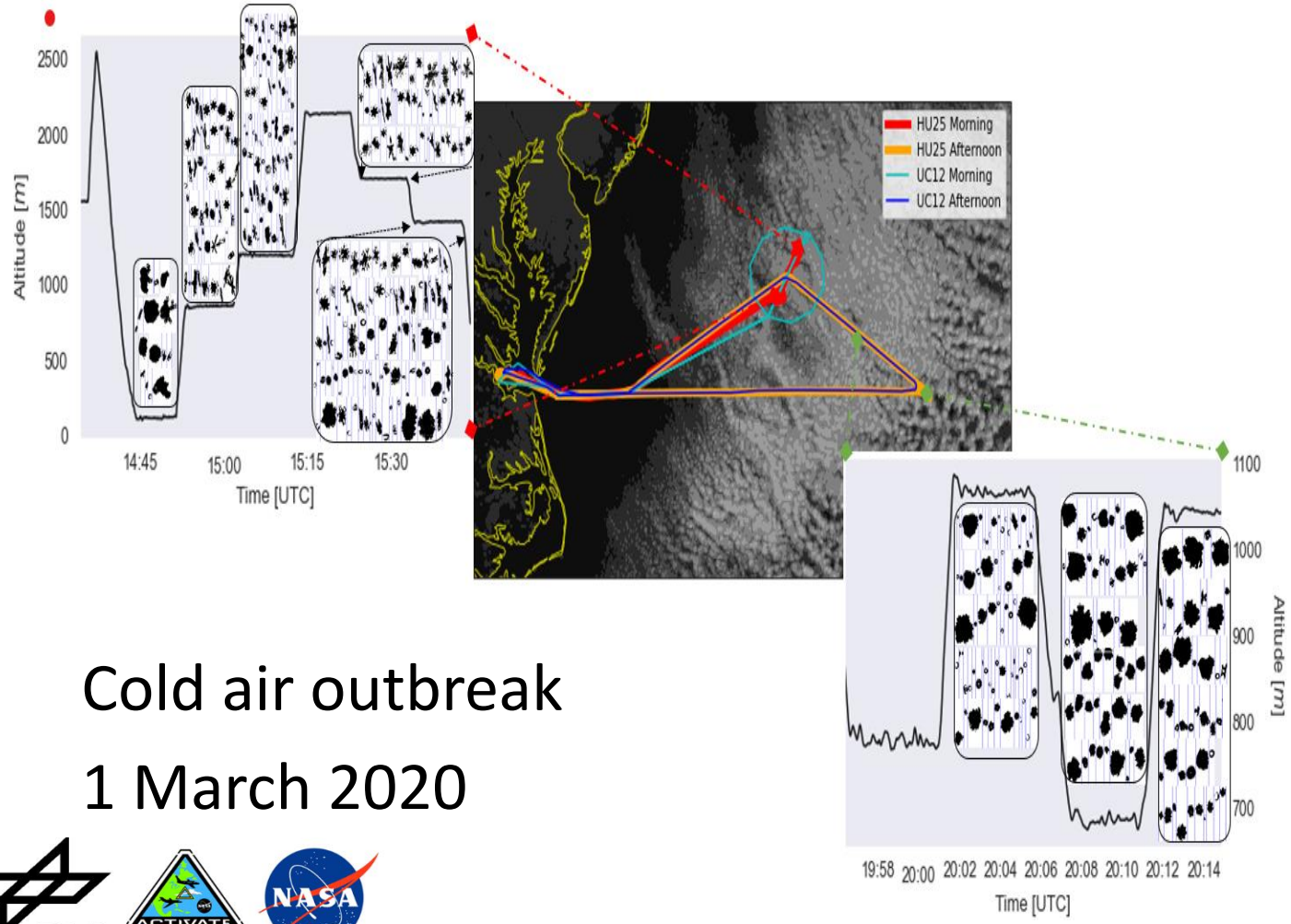
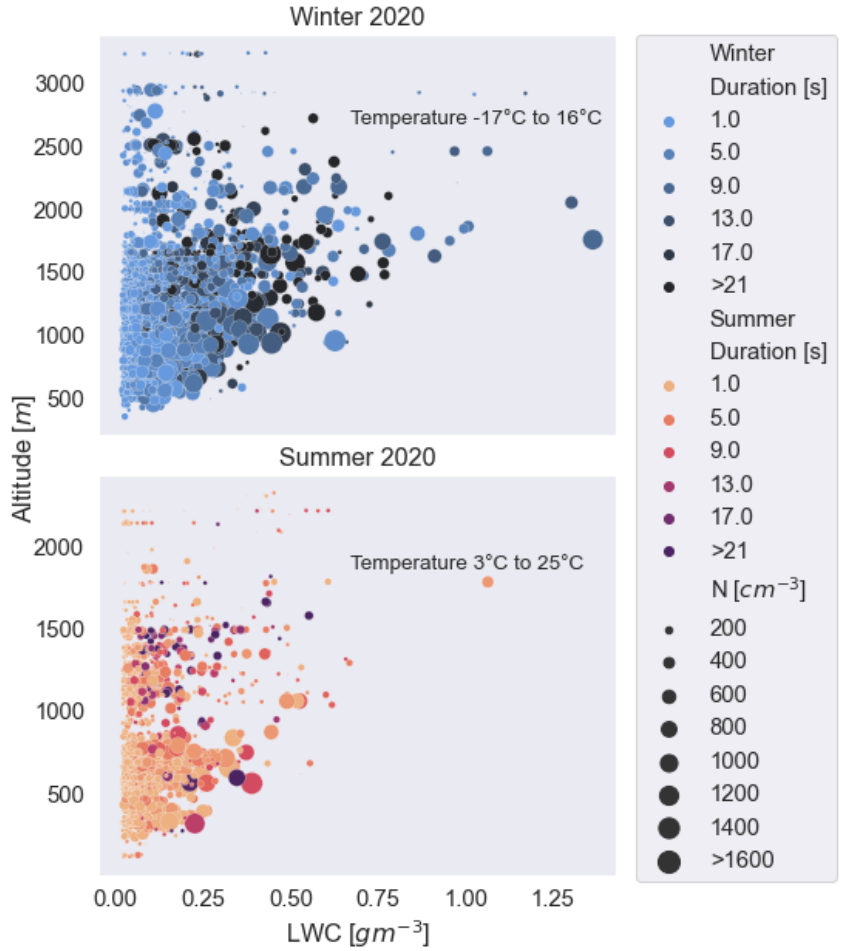
Example use of cloud probe data during activate from CDP, FCDP and 2D-S (NASA-LARC, DLR)



Cold air outbreak

1 March 2020

Seasonal cloud statistics



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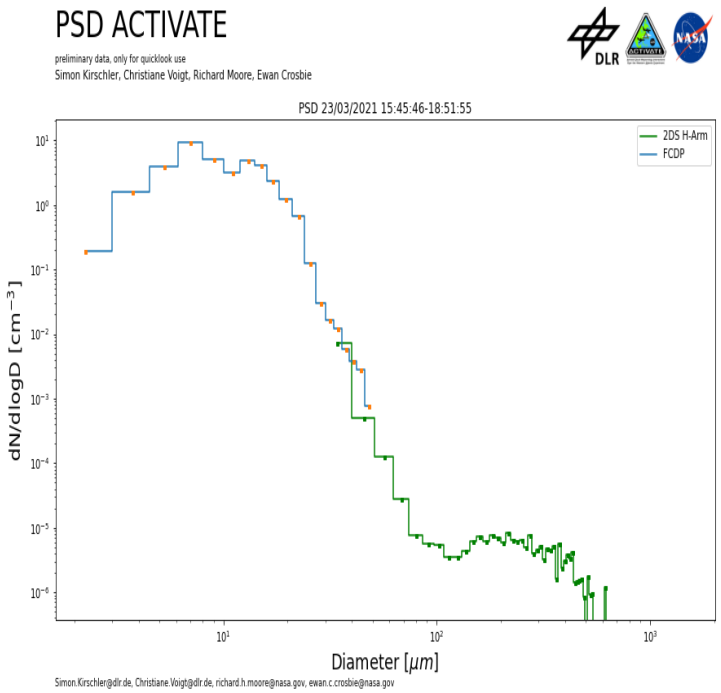
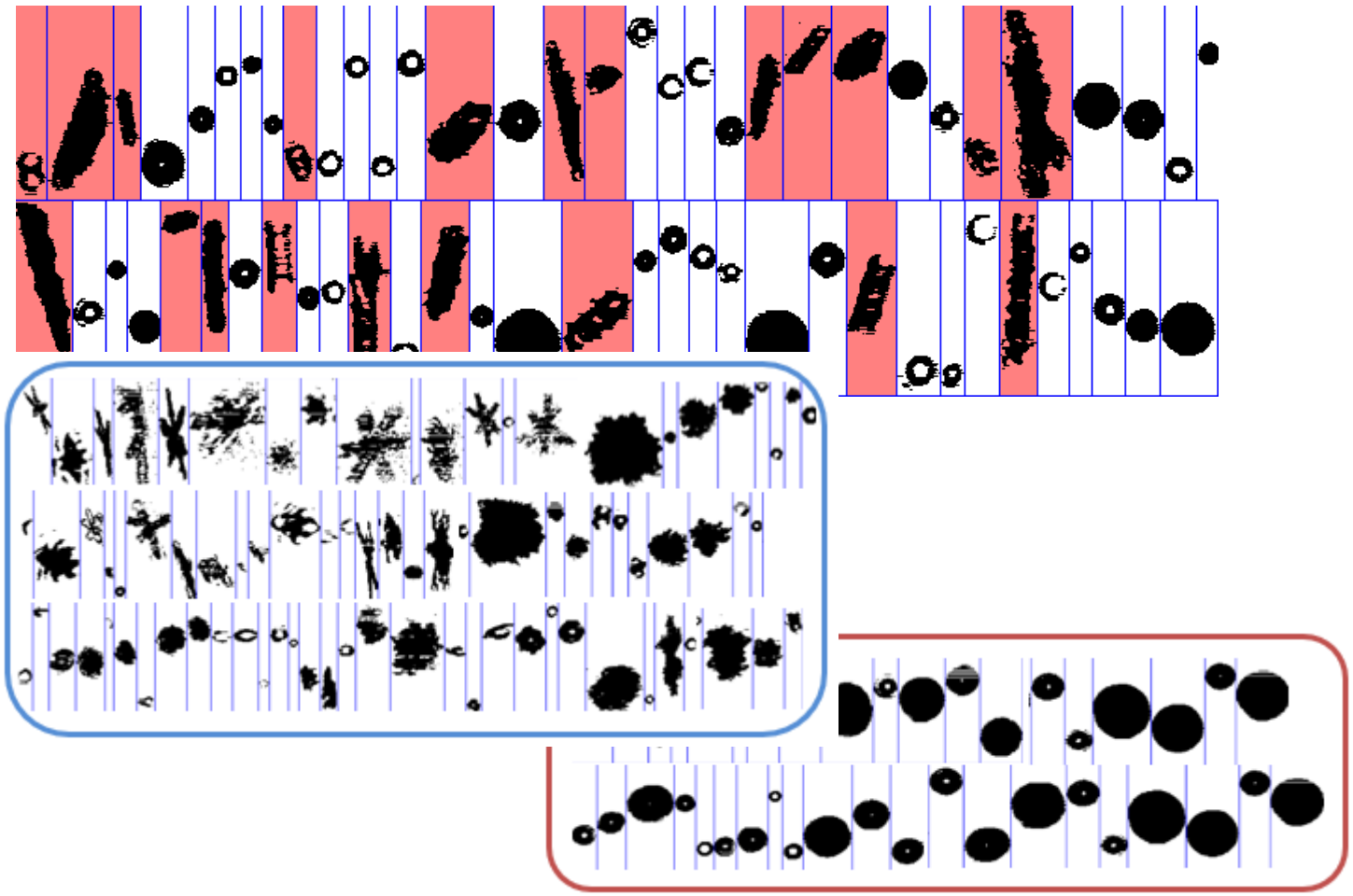
Cloud microphysical properties & cloud phase

Particle size distribution

23 March 2021



Particle shape for phase discrimination



Timeseries of cloud data

N FCDP

N 2DSliq

N 2DSice

LWC FCPP

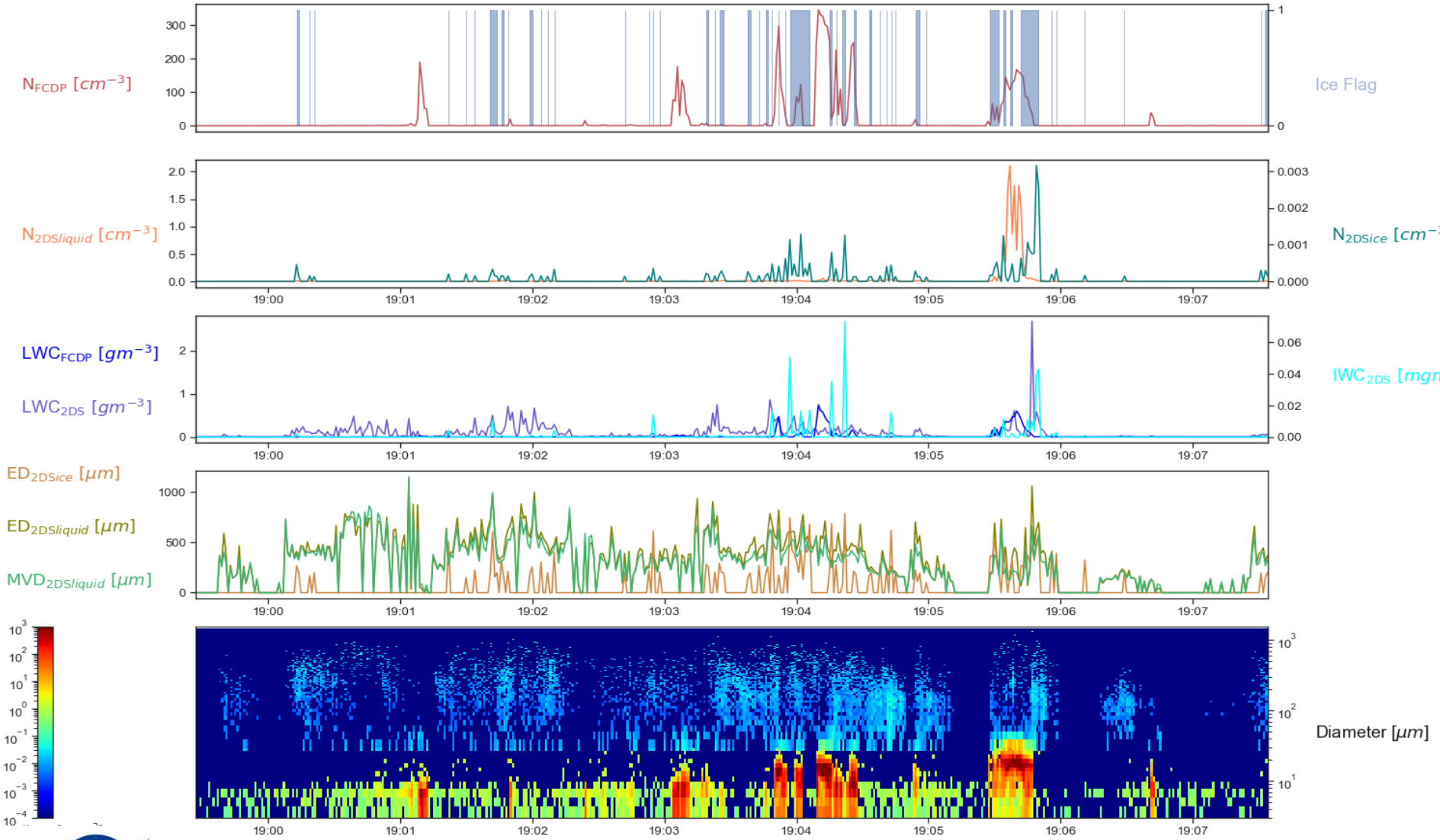
LWC 2DS

ED 2DSice

ED 2DSliq

MVD 2DS

PSD



Ice Flag

N2DSliq

IWC

D

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Survey of microphysical properties of marine boundary-layer clouds in the Western North Atlantic

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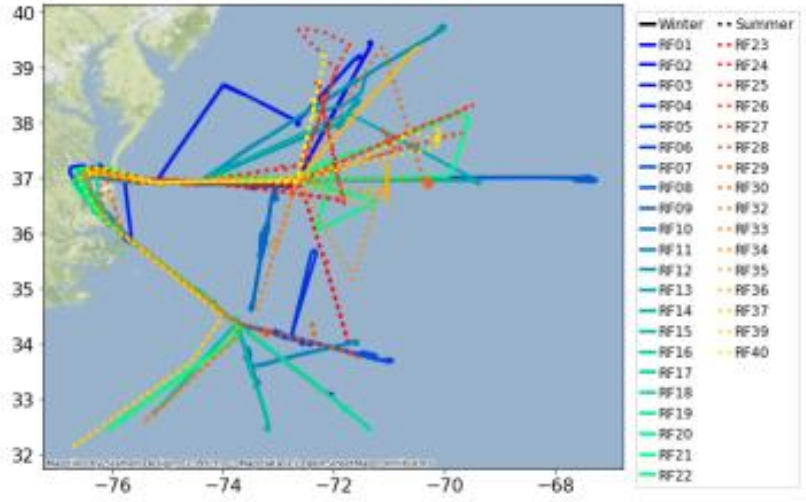
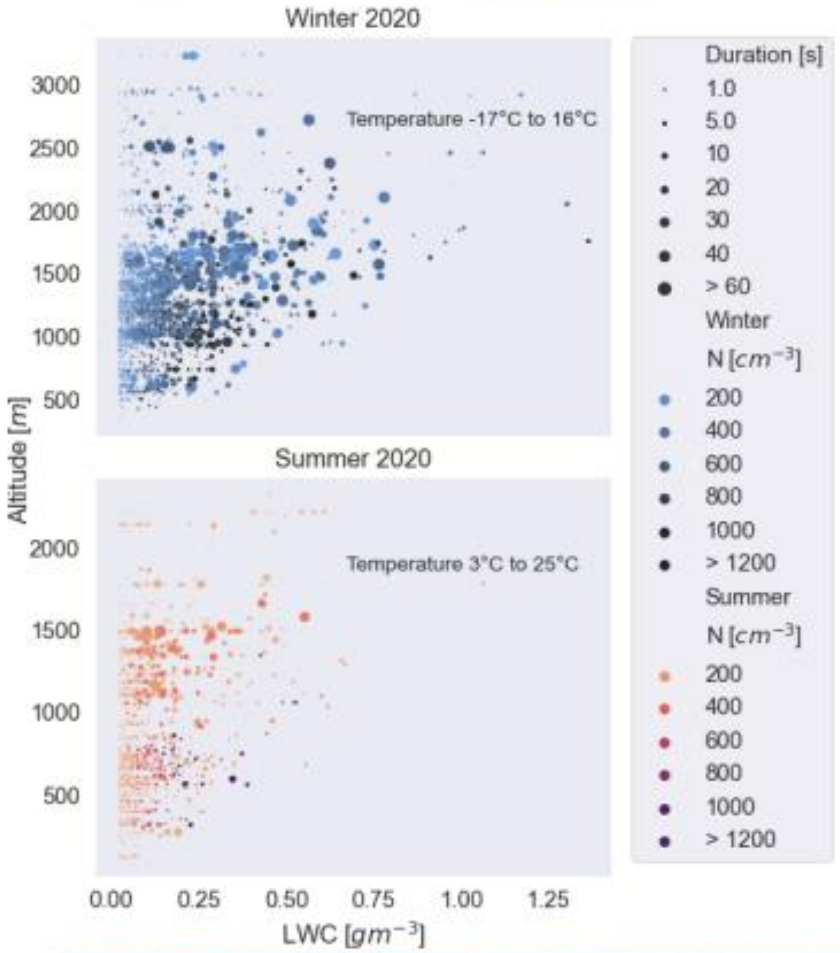
1.) ACTIVATE Campaign

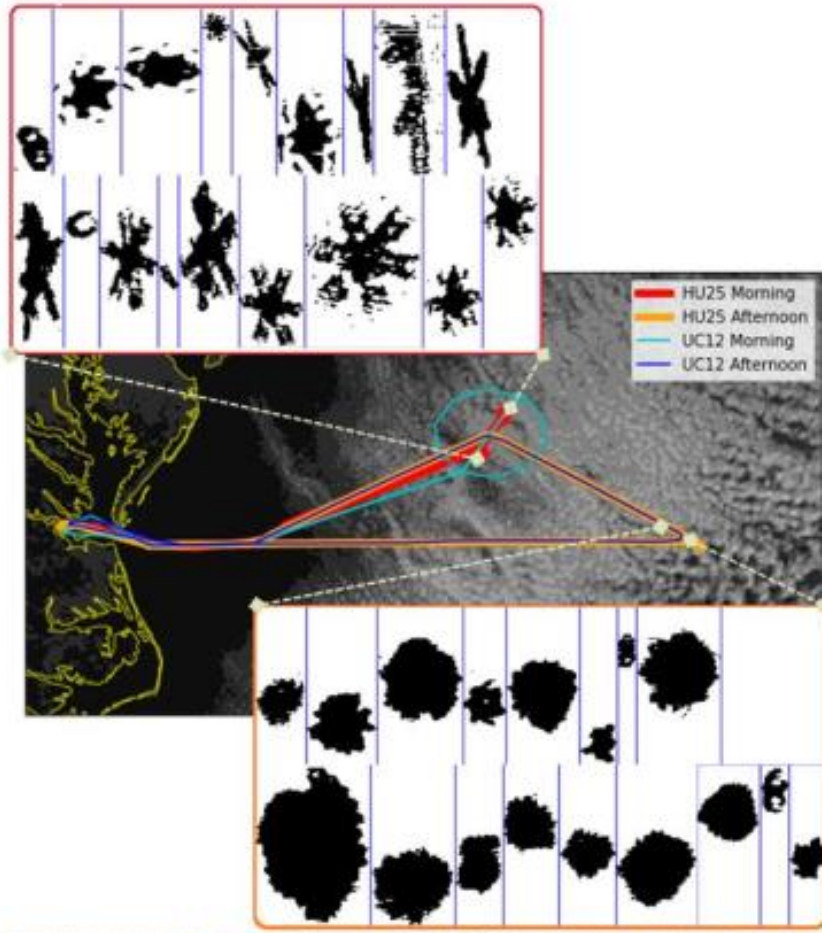


- 35 simultaneous flights by HU-25 (Falcon) and UC-12 (KingAir B200)
- Satellite Underflights:
  - Winter 2020: 1 ASTER
  - Summer 2020: 1 ASTER
  - 3 CALIPSO

2.) Oceanic Cloud Properties



3.) Cold Air Outbreak March 1st 2020



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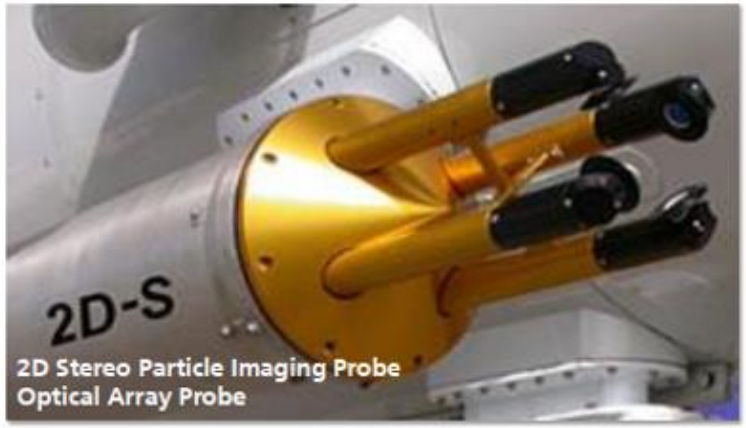
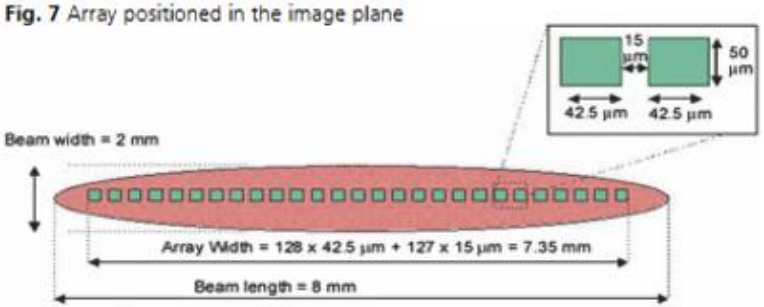


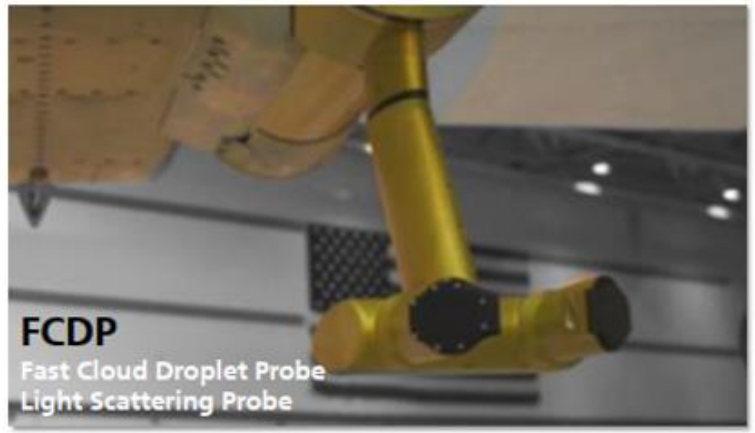
Principle of Operation

- Laser produces a sheet of laser light that passes between the windows located on the inboard sides of the optical arms.
- Sheet of light is directed onto linear array.
- Array is sampled at a rate proportional to the particle's velocity such that image slices are taken at the pixel resolution.

Fig. 7 Array positioned in the image plane



Particle detection size	11,4 µm – 1463 µm
Manufacturer	SPEC, inc.
Sample Area	Variable; depends on tip configuration and particle size.



Principle of Operation

- Cloud particles cross the focus of open path laser beam and are illuminated.
- Light is scattered and detected by 2 photo diodes in a forward angular range (4° to 12°).
- On the basis of Mie theory, particle size and concentration is derived.

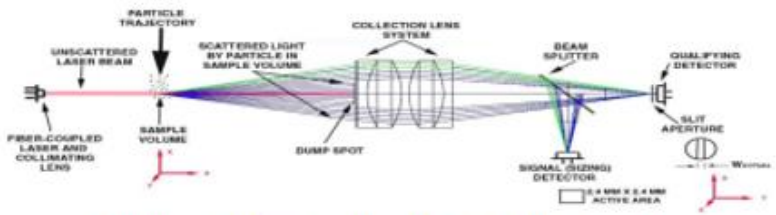


Fig. 2 Diagrammatic representation of the principle of operation

Particle detection size	1 - 50 µm
Manufacturer	SPEC, inc.
Sample Area	0.09 – 0.25 mm² Variable; depth of field dependent