Flight Scientist Report
Monday 02/17/2020 ACTIVATE RF03

Flight Type: Statistical Survey Flight - Clear
Flight Route: ATLIC-JETER-LYNUS-ISLES (avoid cirrus to east and south); boundary layer gradient from warm to cold water - excellent case flight for that type of work
Special Notes: NA

King Air
3.3 hrs

- 12 degrees of crab at FL250; did not go higher to avoid higher crab (RSP issue)
- Came down to get below cirrus
- Aircraft issues that require work
    - Left fuel control unit
    - GPS
- Did most turns at <=20 degree bank to keep lidar from shutting off
- Did 30 degrees at turnaround point
- Good day
- Taking baseline measurements in turns, when bank <=20 degrees
- Got 4 baseline profiles for post-flight analysis of baseline variability

Instruments:
AVAPS: good
RSP: good; closed RSP shutter for 3 minutes due to cirrus encounter; not sure whether that was an issue.
HSRL-2:

- Heat-soaking interferometer seemed to improve performance
- Today heat- soak was started at about 2.5 hours before TO
- Heat soak should be standard procedure going forward
- CR was stable for entire flight but not as high as previous missions
    - Injected-pulse CR was 15-20. Mostly stable at 17.5; went to 20 at very end of flight before temperature tweaking. The bump to 20 occurred abruptly at the turn at ATLIC on the return. Some speculation on cause due to aft optics heating from sunlight hitting instrument after turn.

Falcon
3.3 hrs

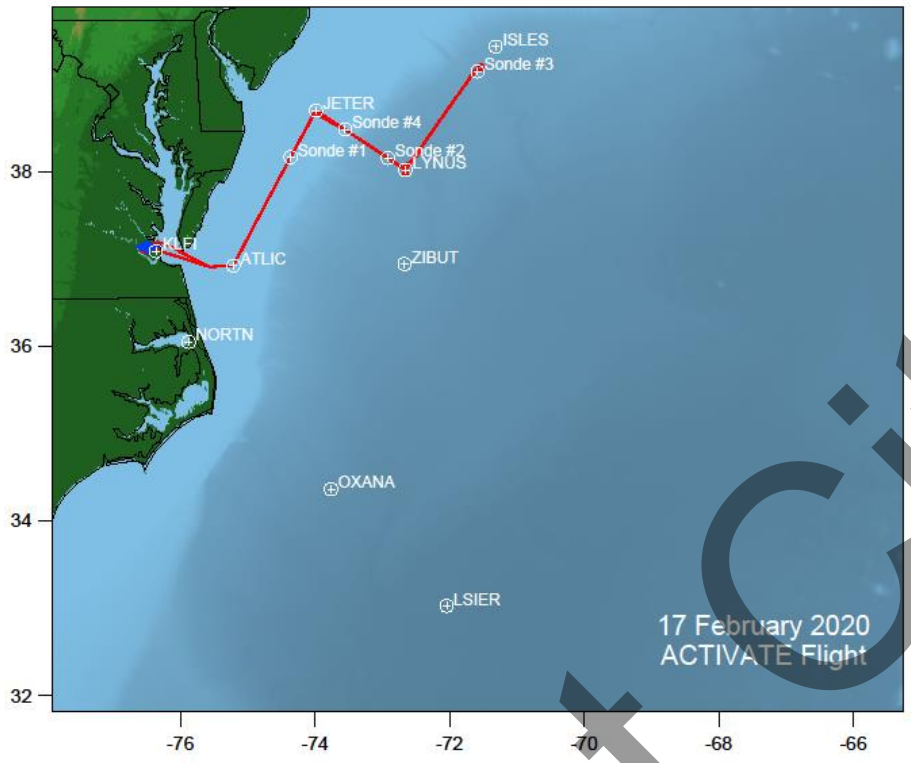
- Able to get to 500 AGL. Saw clouds on the northern end.
- Still cannot get radio communication when flying these altitudes.
- On-time take-off
- Flight went well; 9 clear air ensembles and 1 cloud ensemble
- Able to get to MINALT
- Some clouds in the area

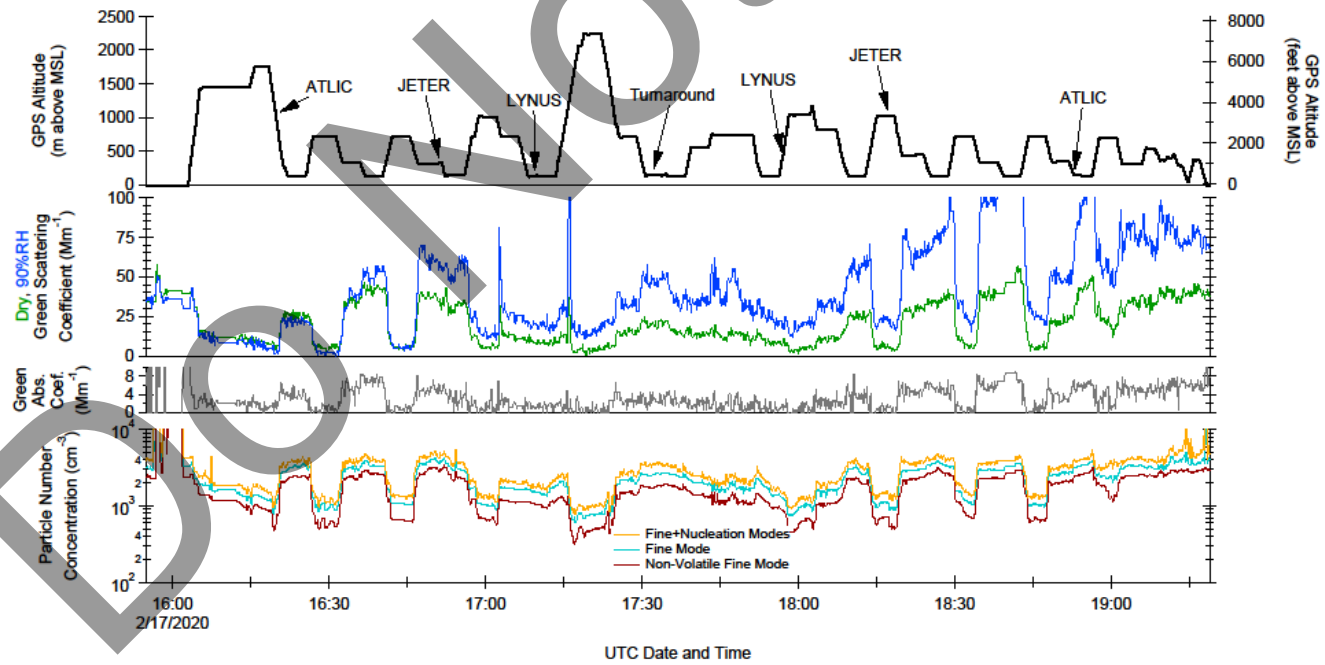
    - For some had to climb to 8kft to get above
- CRM work went well
- No aircraft issues
- Power swap still not perfect, but have figured out what they need to do. Will involve both an AC and DC power cart or using AC cart and DC from APU. APU will burn fuel
- Did not get to try the HF radio for comm; were always within NY Center.
- Falcon's 270 turn was implemented to do a delay for UC-12 to catch up.
- Timing between aircraft was excellent (Rick Yasky: 9.8 out of 10)

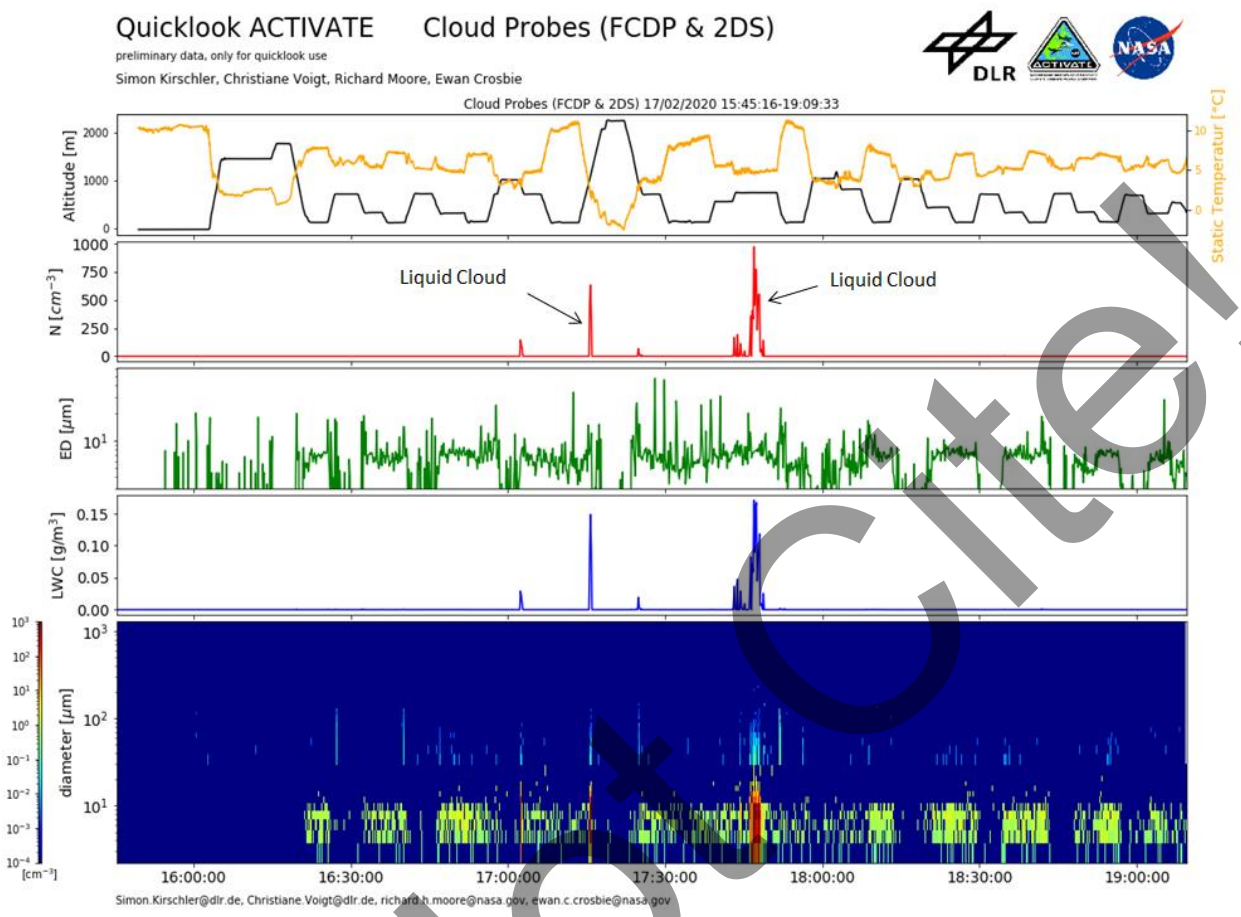
Instruments:

- Went really well
- Had to modify modules for some clouds
- Did a hybrid clear-cloudy module
- Real-time lidar info was helpful via chat
- In-Flight chat message at 10:53:17 : “quick summary: we did a BCB leg before the thickest section of cloud, then ran ACB 500ft higher, extended by a 1min or so then CB climbed up so we ran a second BCB for 2 mins now descending to MINALT to resume clear modules; I think we made the most of it, only thing missed was a BCT leg”; another version after flight: By the turnaround point, we did not complete a full cloudy module because we only did one set of BCB/ACB and we did not get BCT. We did 3 full clear modules up to LYNUS, between LYNUS and the turn we still executed a clear module. Just before LYNUS on the return was the start of a set of 5 full clear modules giving a total of 9 clear modules. Between the turnaround and LYNUS we did MINALT-BCB-ACB-BCB (same alt as ACB)-MINALT, with the ACB nearly centered over the thickest part of the cloudy region. The small jump in altitude around 18:20 in the Free Trop leg was to get comfortably above the inversion base to make sure we are truly in Free Trop.

Rich Moore Quicklook Images



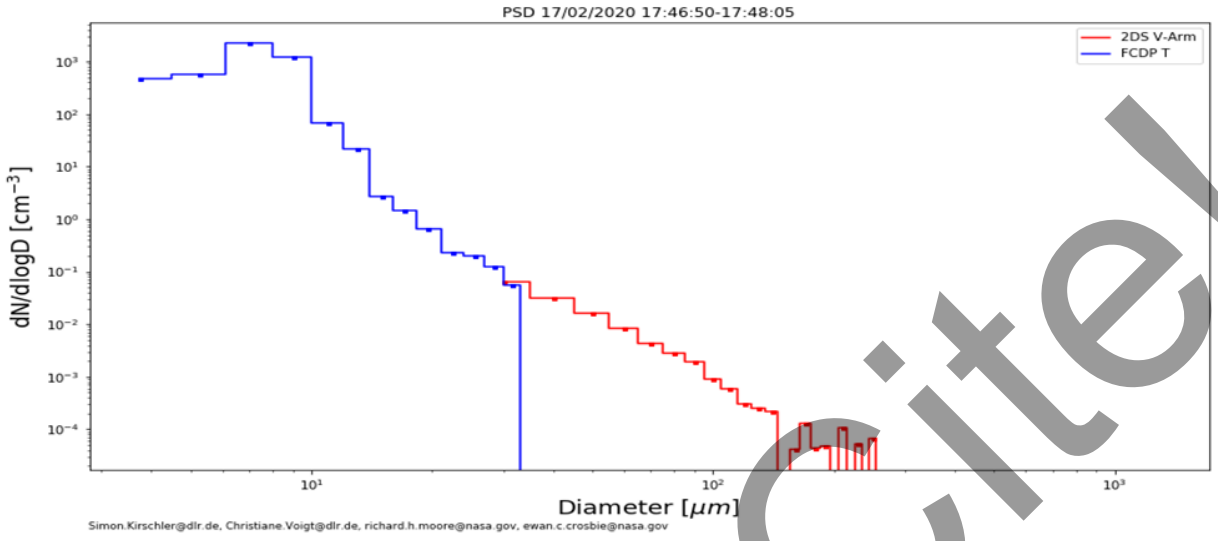



Quicklook ACTIVATE Cloud Probes (FCDP & 2DS)
preliminary data, only for quicklook use
Simon Kirschler, Christiane Voigt, Richard Moore, Ewan Crosbie
Cloud Probes (FCDP & 2DS) 17/02/2020 15:45:16-19:09:33
Altitude [m]
Static Temperatur [°C]
N [cm⁻³]
Liquid Cloud
Liquid Cloud
ED [µm]
LWC [g/m³]
diameter [µm]
[cm⁻³]
16:00:00
16:30:00
17:00:00
17:30:00
18:00:00
18:30:00
19:00:00
Simon.Kirschler@dlr.de, Christiane.Voigt@dlr.de, richard.h.moore@nasa.gov, ewan.c.crosbie@nasa.gov

PSD ACTIVATE

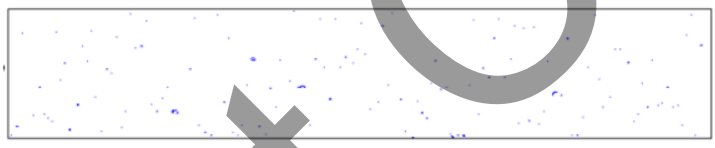
preliminary data, only for quicklook use

Simon Kirschler, Christiane Voigt, Richard Moore, Ewan Crosbie

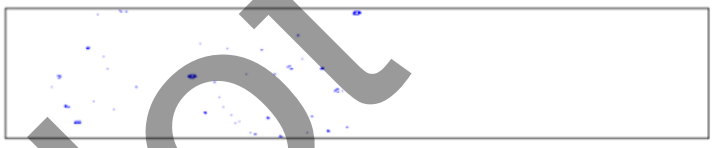


Simon.Kirschler@dlr.de, Christiane.Voigt@dlr.de, richard.h.moore@nasa.gov, ewan.c.crosbie@nasa.gov

Liquid Cloud: 17:25:59

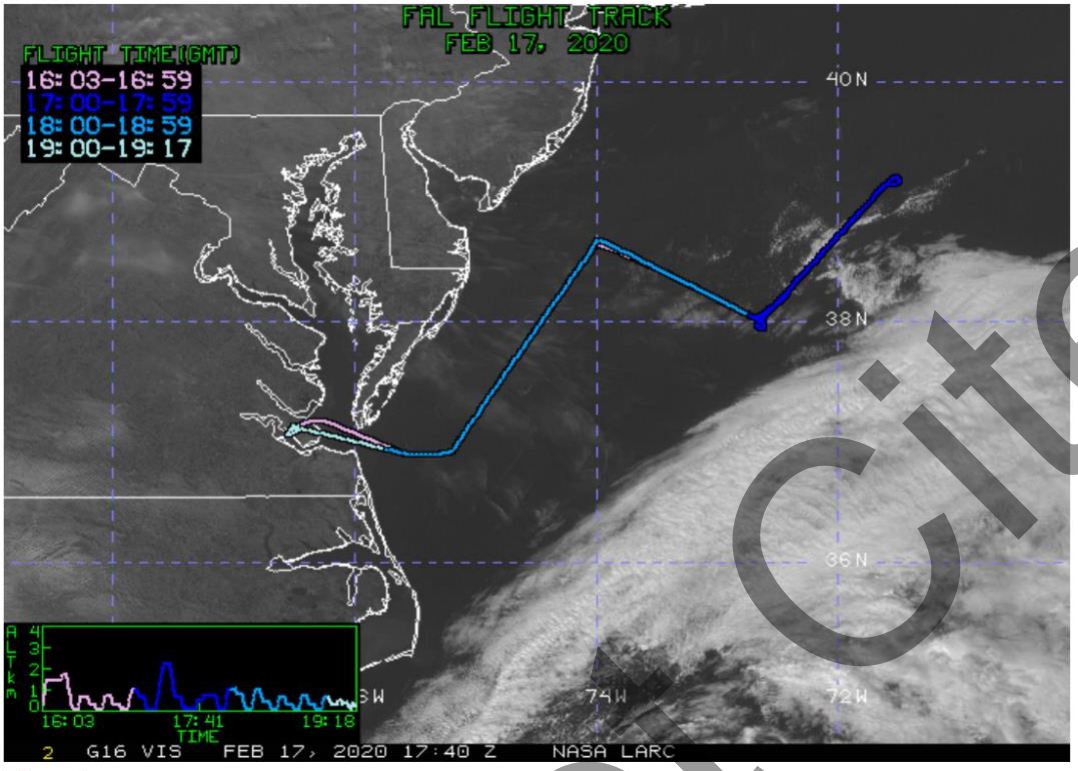


Liquid Cloud: 17:47:15

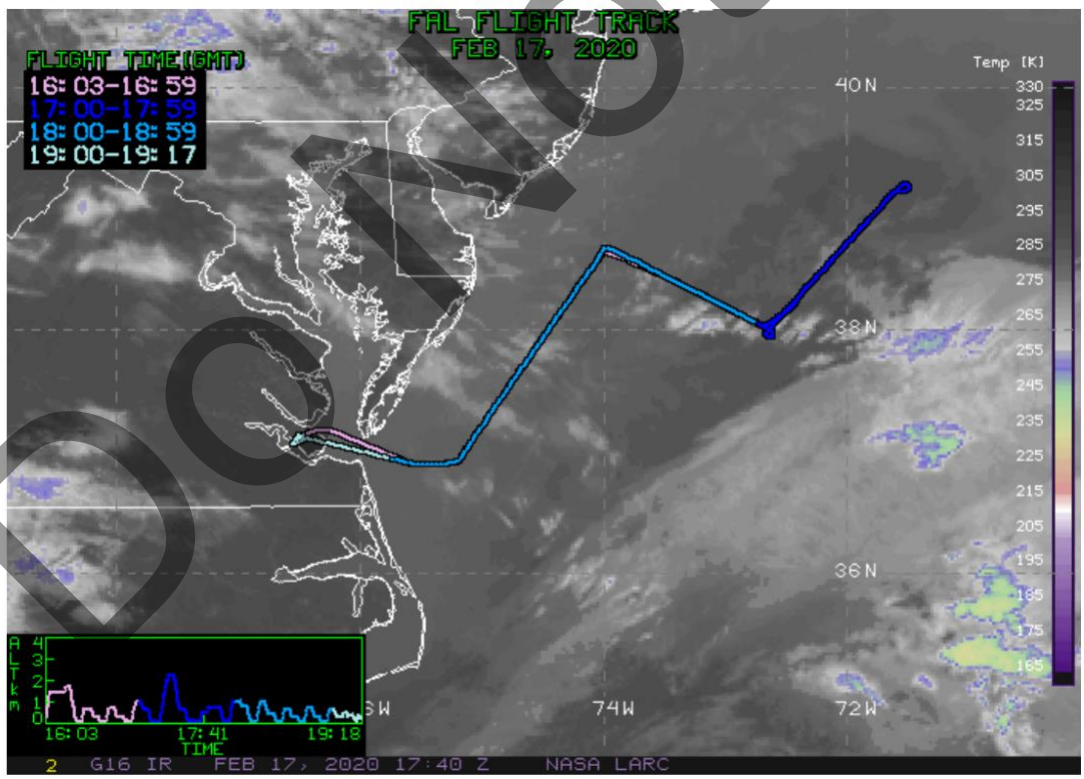


Satellite Group Images (near middle of flight):

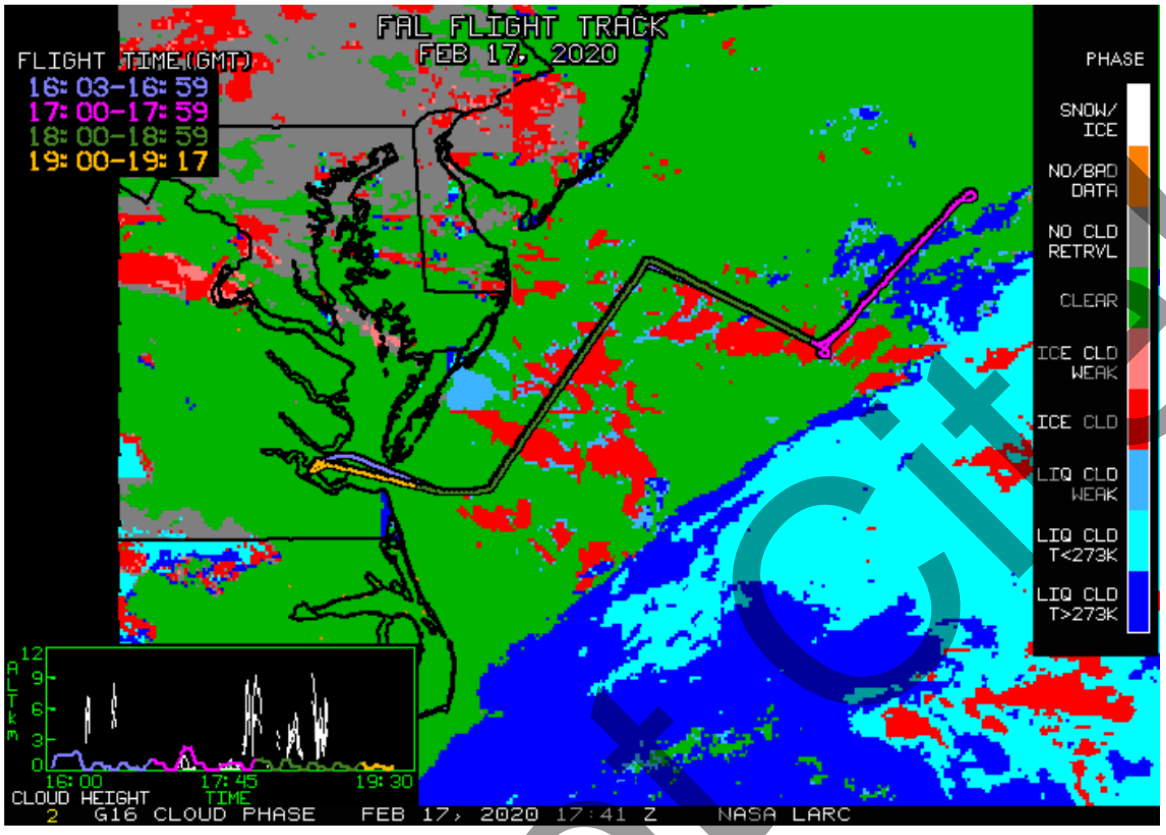
Visible



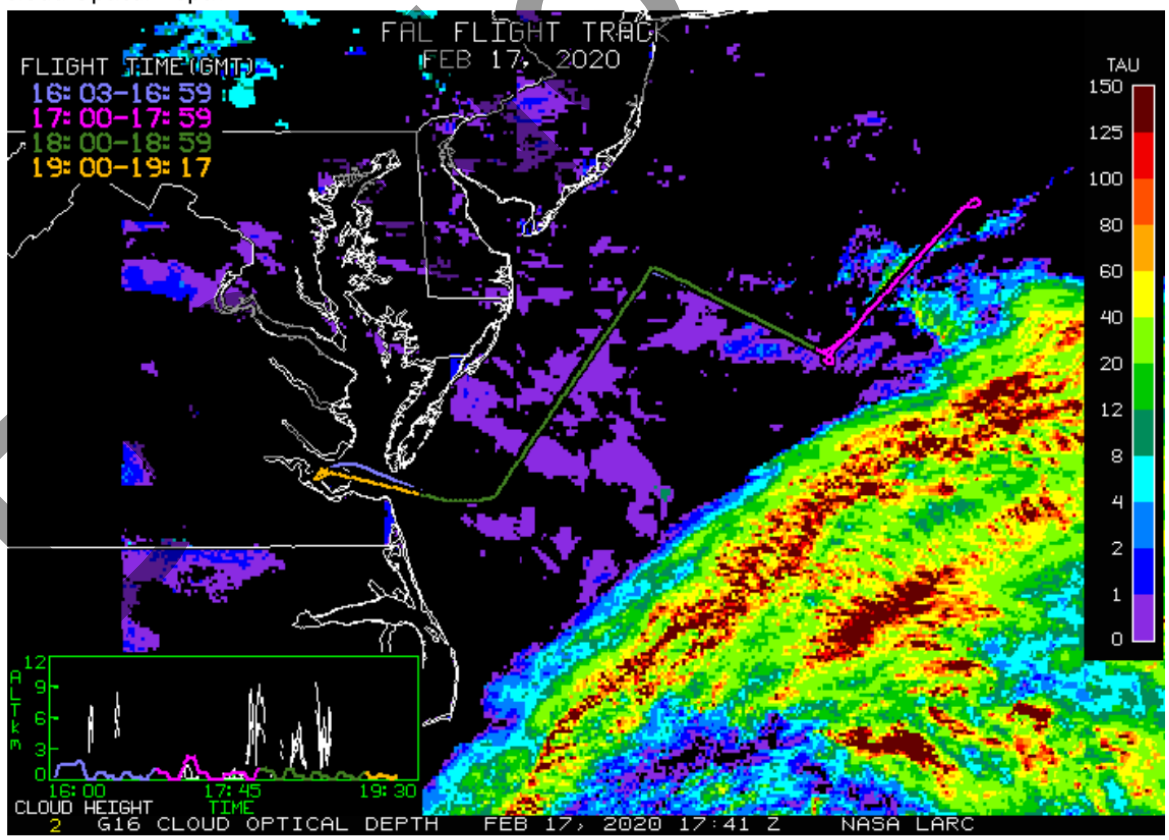
Infrared



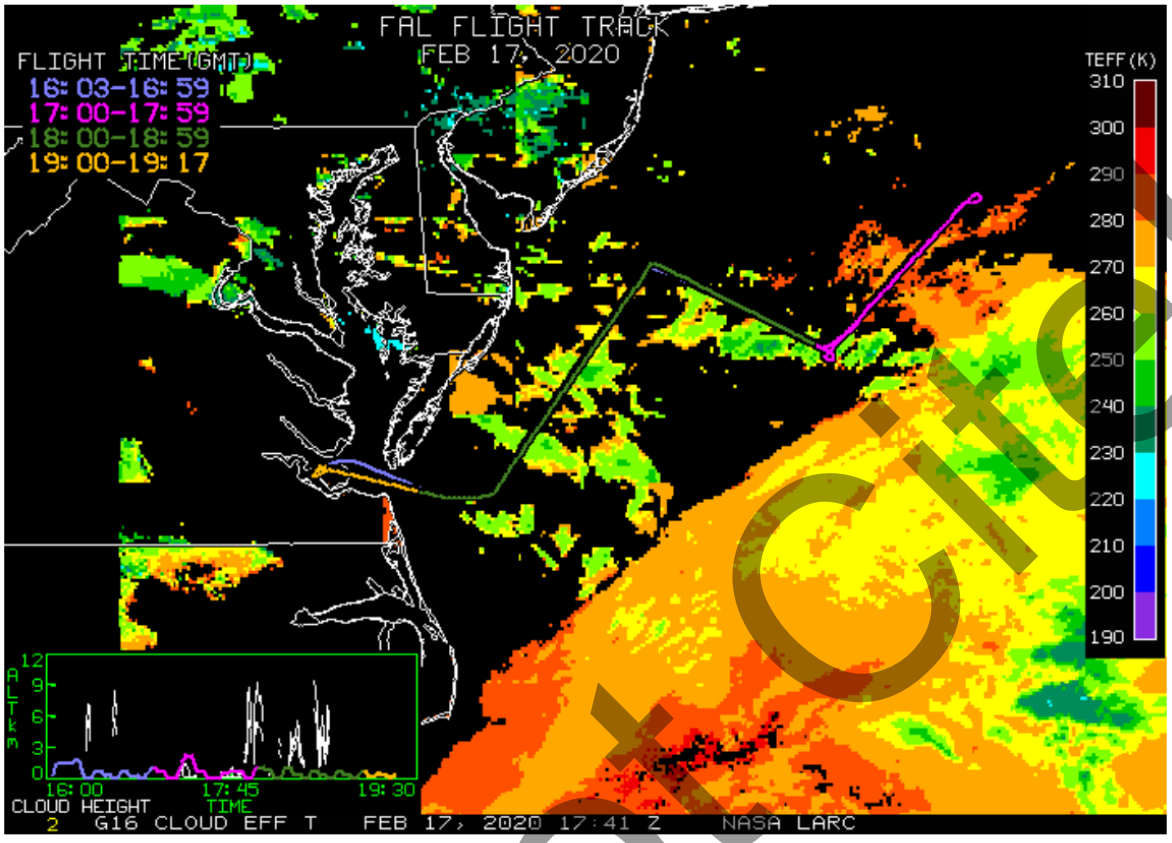
Cloud Phase



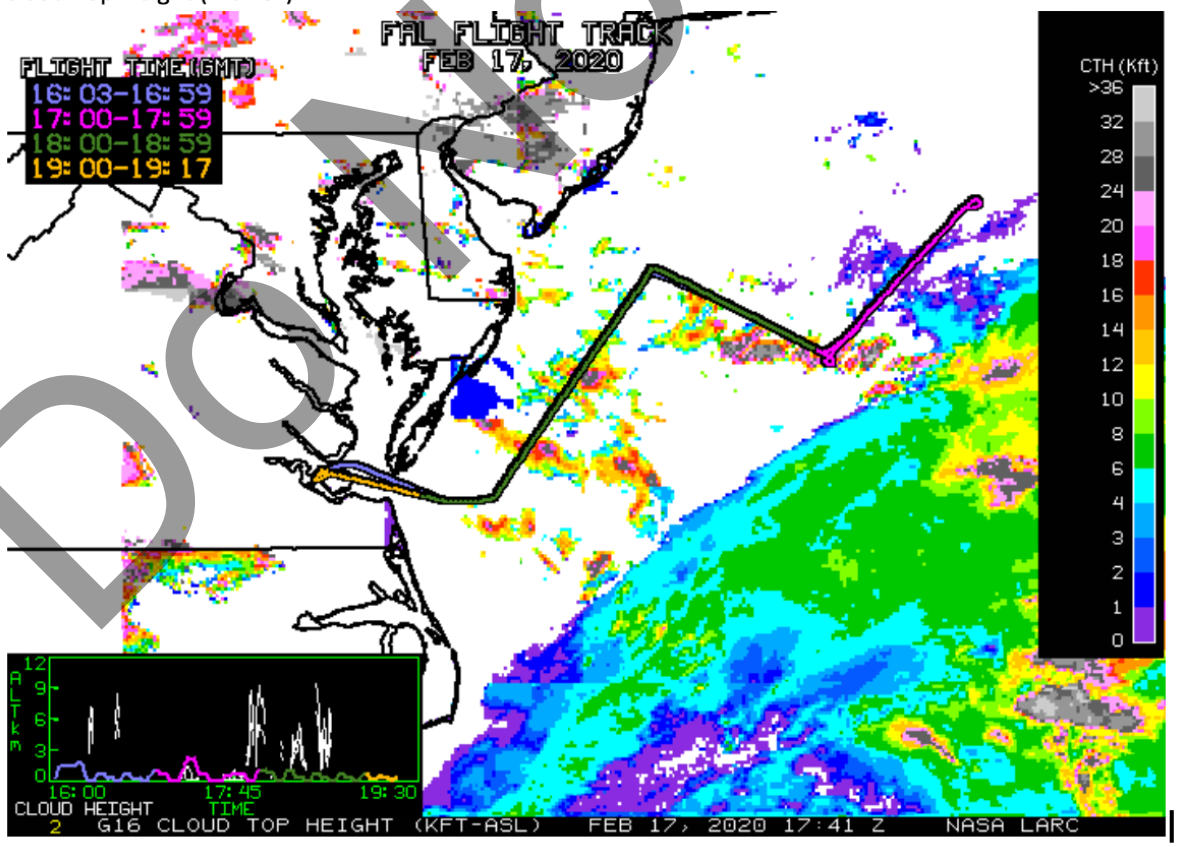
Cloud Optical Depth



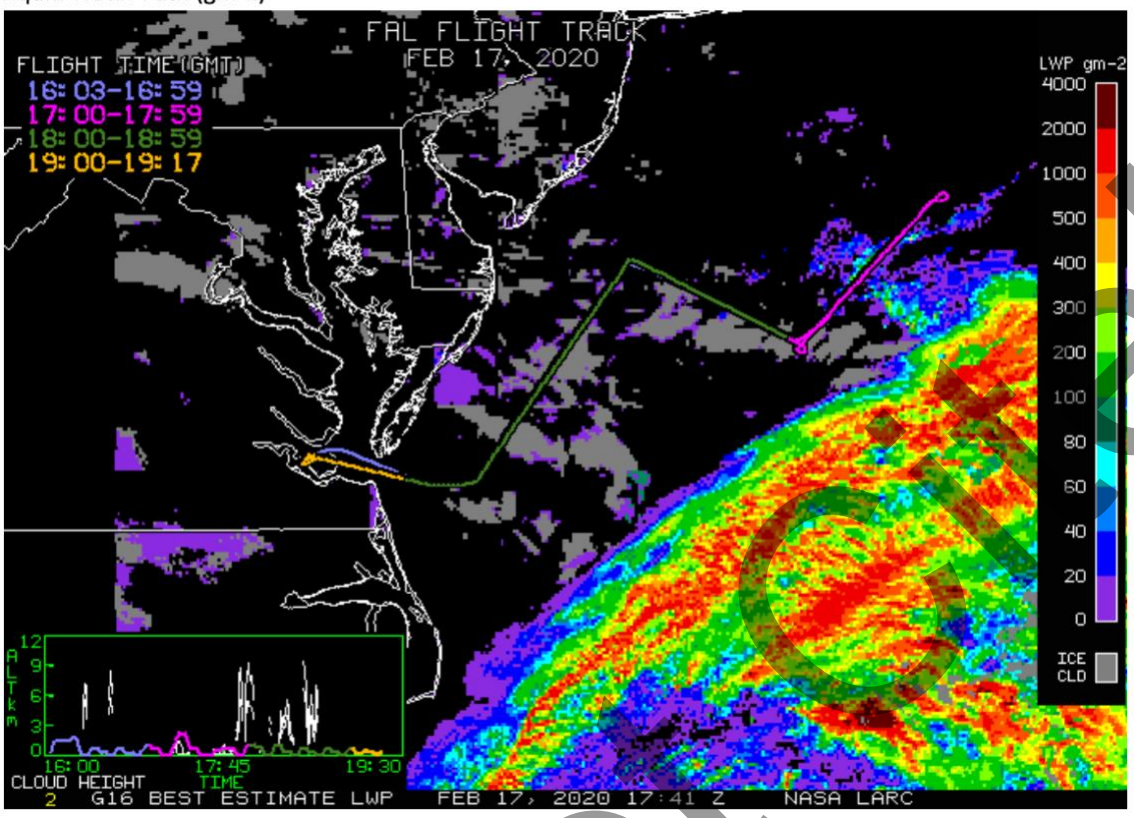
Cloud Effective Temperature (K)



Cloud-Top Height (Kft-ASL)



Liquid Water Path (gm-2)



Cloud Droplet Number Concentration (cm-3)