Flight Scientist Report
Friday 01/29/2021 ACTIVATE RF43

Flight Type: Statistical Survey - Clouds
Flight Route: KLFI KECG OXANA LSIER OXANA KECG KLFI
Special Notes: No joint flight with UC-12 as that plane flew in morning and there are pilot staffing issues to allow both planes go at once.

King Air
No joint flight due to pilot staffing issues.

Falcon
Pilot report from Luke Delaney: Second science flight for the HU-25 Falcon in support of ACTIVATE Campaign #3. This sortie was conducted solo (independent of the UC-12) but covered the same geographic area as the UC-12 flight executed earlier in the day. Departed for the southern corridor (AR8) and transited oceanic (ECG to LSIER) at altitudes ranging from 500 ft AGL to 7500 ft MSL. Data was collected below/above/within the boundary layer segment and include water/mixed/ice precipitants. Light to moderate turbulence was encountered during portions of the event with no anticipated impact on the collection effort. Additionally, occasional ice accumulation on the right-wing instrumentation probe was encountered, which required descent toward minimum altitude for shedding. All objectives were achieved and no system discrepancies were noted.

Flight scientist report from Ewan: There are some power issues in the Falcon that need to be worked out. There is interference between some of the instrument circuits that was affecting the temperature (and other) data before flight. The CAPS probe was found to be a potential culprit and for caution it, plus the WCM probe, were not run because they are on the same power bus. We also had a repeat of the scroll pump issue where we lost power on that circuit but it was resolved by switching back from the aircraft power to a ground cart and then attempting the power transfer again which was successful. During the first power transfer, the LARGE UPS dropped out which required a system reboot of everything except the AMS.

After takeoff the flight ops went smoothly. We managed to work some lower altitudes (VFR) overland on the outbound with some vertical profile work too. As forecasted, the cloud edge was close to the OBX. Once under cloud we commenced the normal cloudy stat. survey work. I can't recall all the number of cycles but it was completely standard today.

Science notes: we observed a transition from supercooled droplets to mixed phase as we progressed downwind. It was too cold to collect cloud water near the coast but we collected 4 samples near the far end and on the way home, mostly associated with the mixed phase precip. Cloud base was quite variable dropping quite markedly once we crossed the Gulf Stream. To the SE, cloud tops were higher than were observed by HSRL this morning but then again we did go out much further than them. There was also an uptrend in SO4 offshore and a significant change in the aerosol size distribution between the marine layer and the coastal PBL. Another

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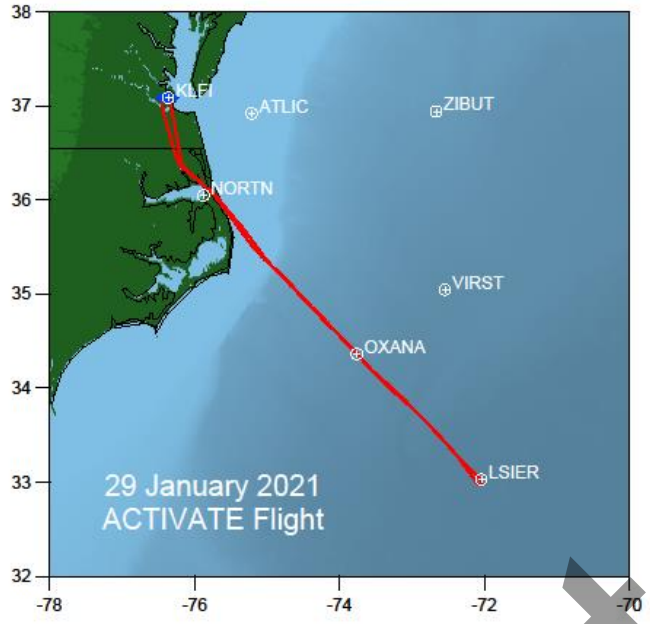
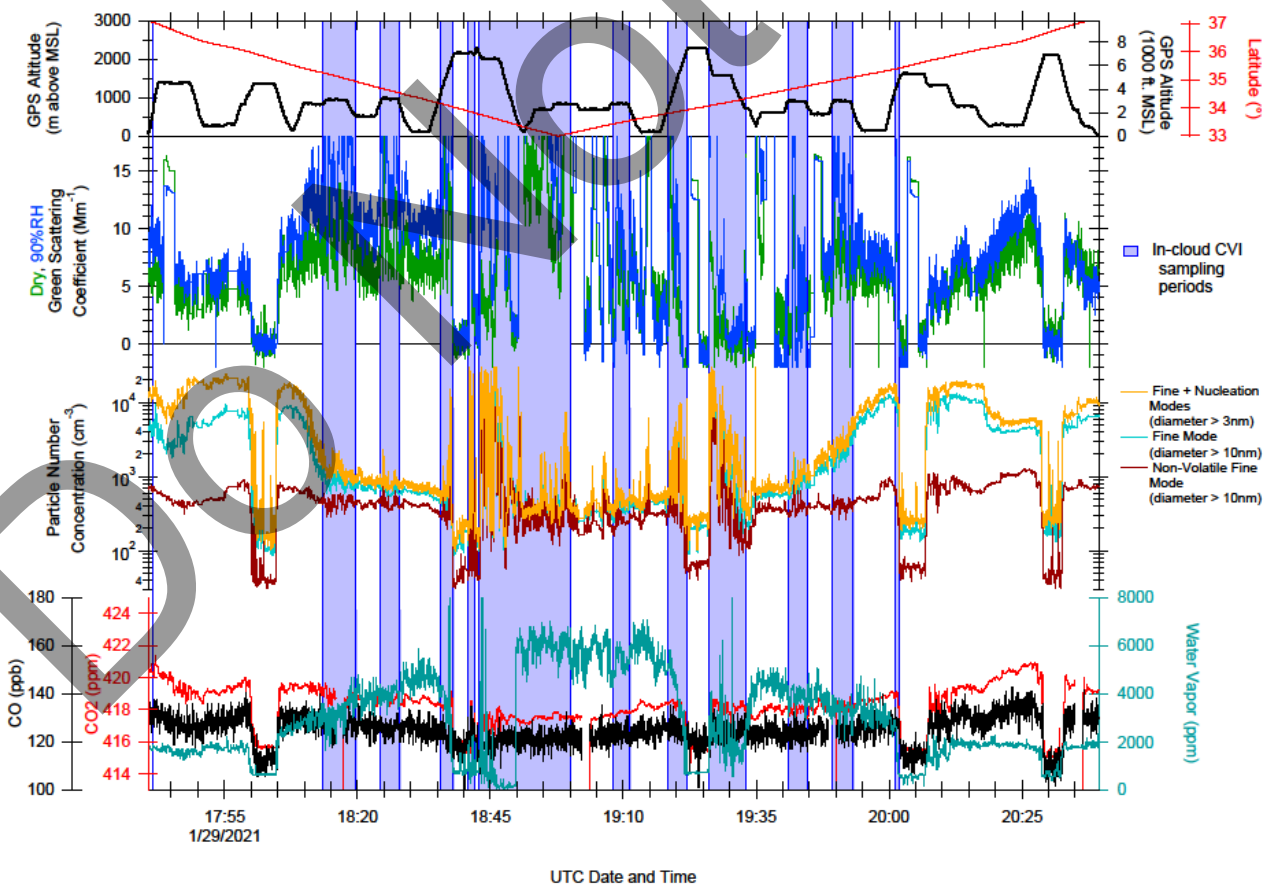
interesting aspect was the fascinating steam fog that was visible atop the ocean surface in a band near where the SST rise is. I have never seen anything like that… other than a hot tub at a ski lodge! We extended our MINALT on the way home to transition the edge of this band. I tried to take some photos but I don't think they do it justice. The pilots also took some.





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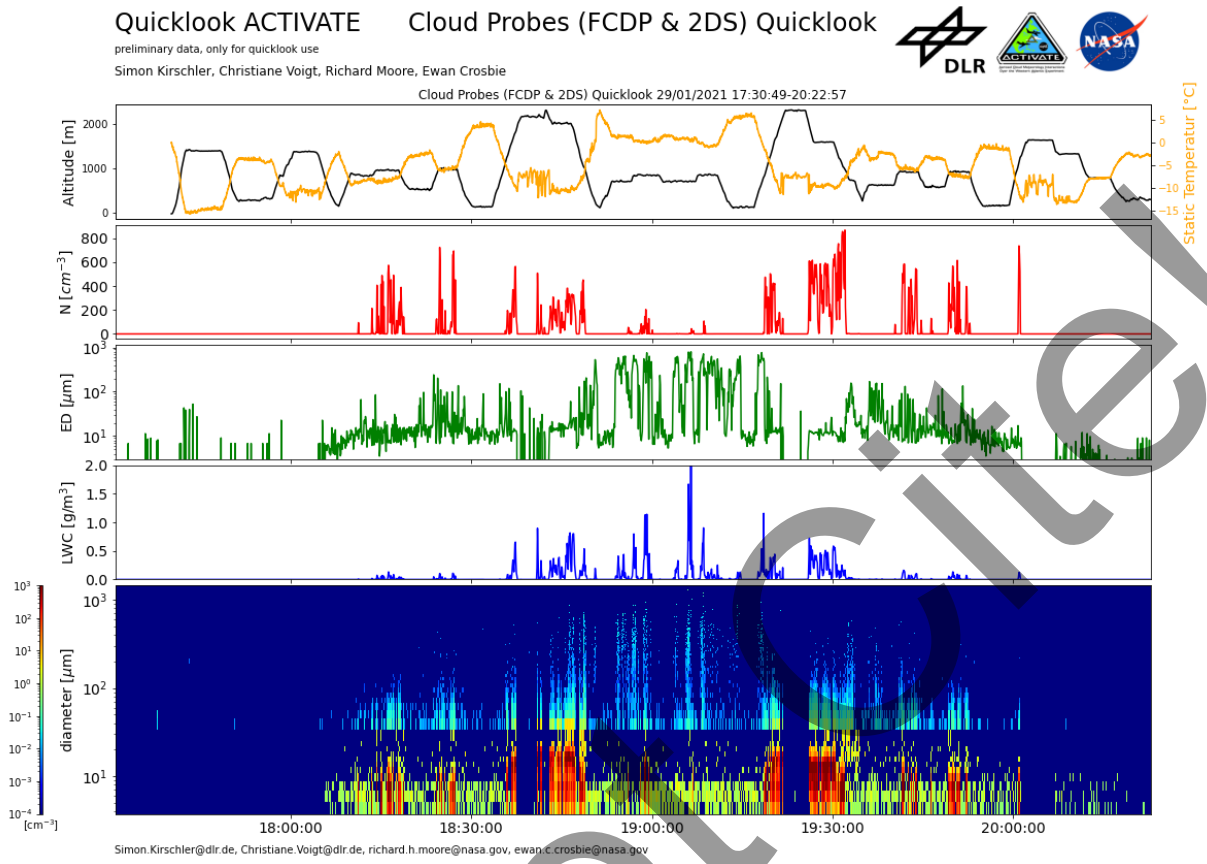
Quicklook ACTIVATE
Cloud Probes (FCDP & 2DS) Quicklook
preliminary data, only for quicklook use
Simon Kirschler, Christiane Voigt, Richard Moore, Ewan Crosbie
Cloud Probes (FCDP & 2DS) Quicklook 29/01/2021 17:30:49-20:22:57
Altitude [m]
Static Temperatur [°C]
N [cm⁻³]
ED [µm]
LWC [g/m³]
diameter [µm]
[cm⁻³]
18:00:00
18:30:00
19:00:00
19:30:00
20:00:00
Simon.Kirschler@dlr.de, Christiane.Voigt@dlr.de, richard.h.moore@nasa.gov, ewan.c.crosbie@nasa.gov

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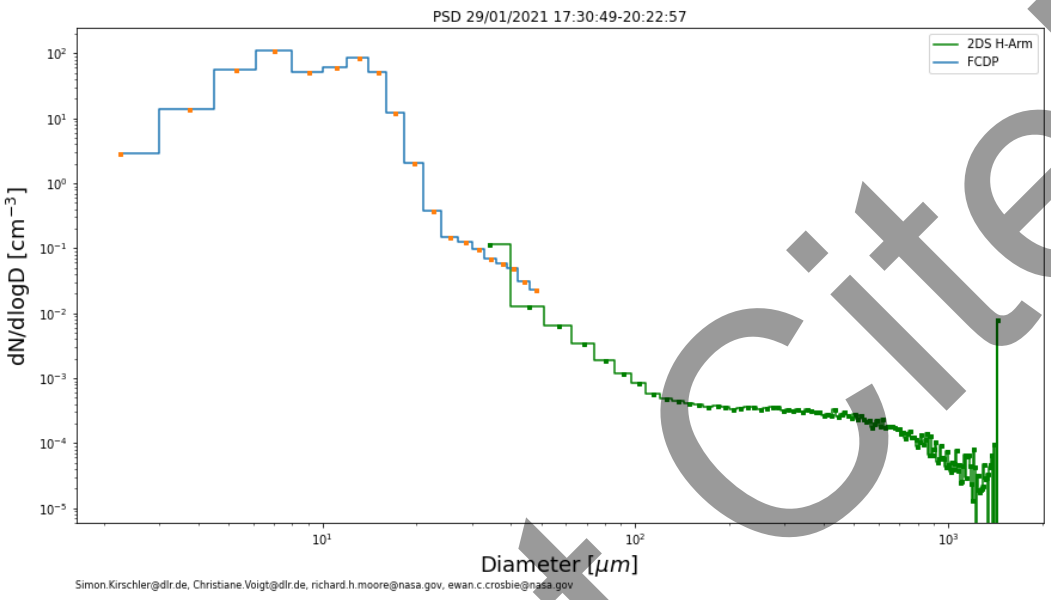
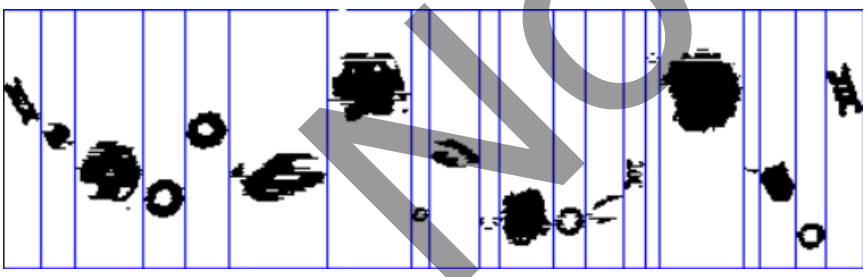
PSD ACTIVATE

preliminary data, only for quicklook use

Simon Kirschler, Christiane Voigt, Richard Moore, Ewan Crosbie





Liquid and mixed-phase Clouds

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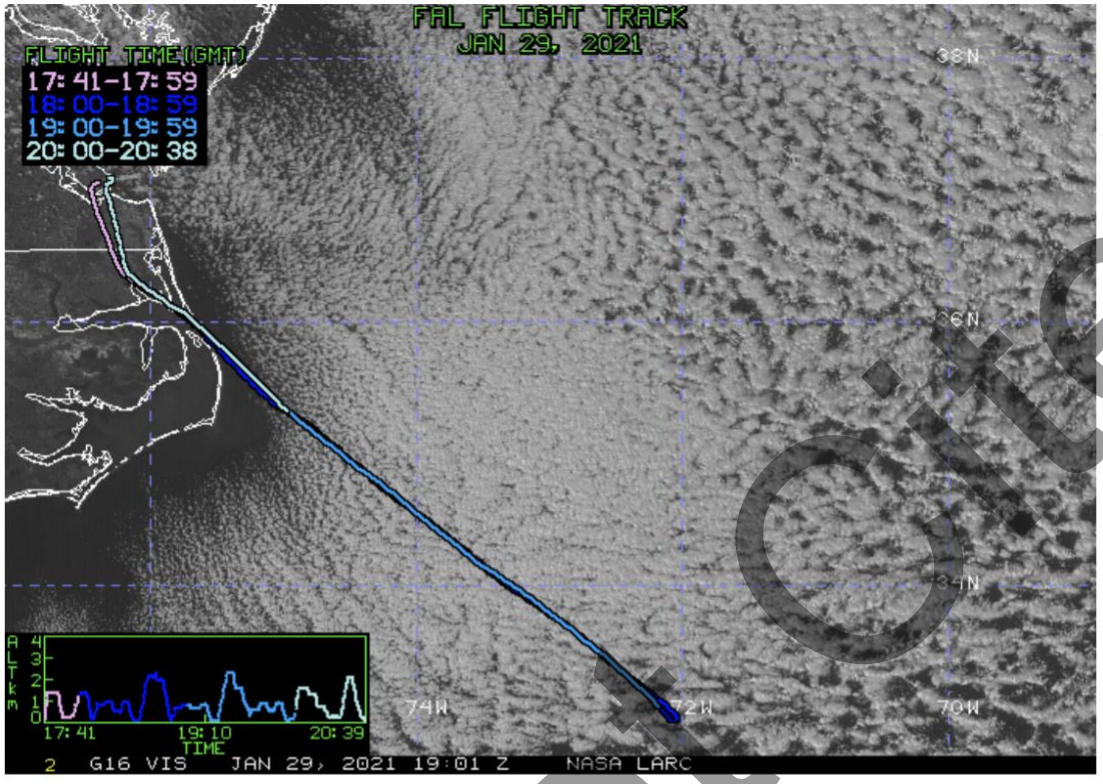
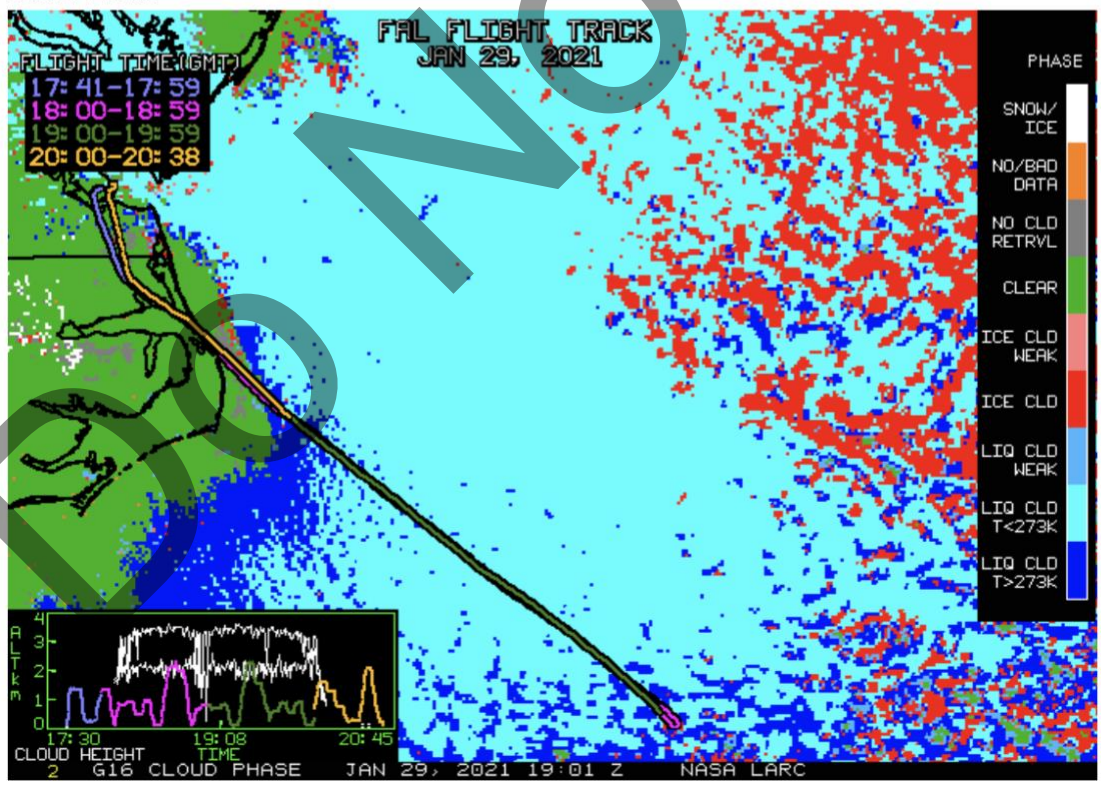
NASA-LaRC Clouds Group GOES-16 Quicklook Images for Flight 43, 19:01 UTC Jan 29, 2021

Visible Image



Cloud Phase



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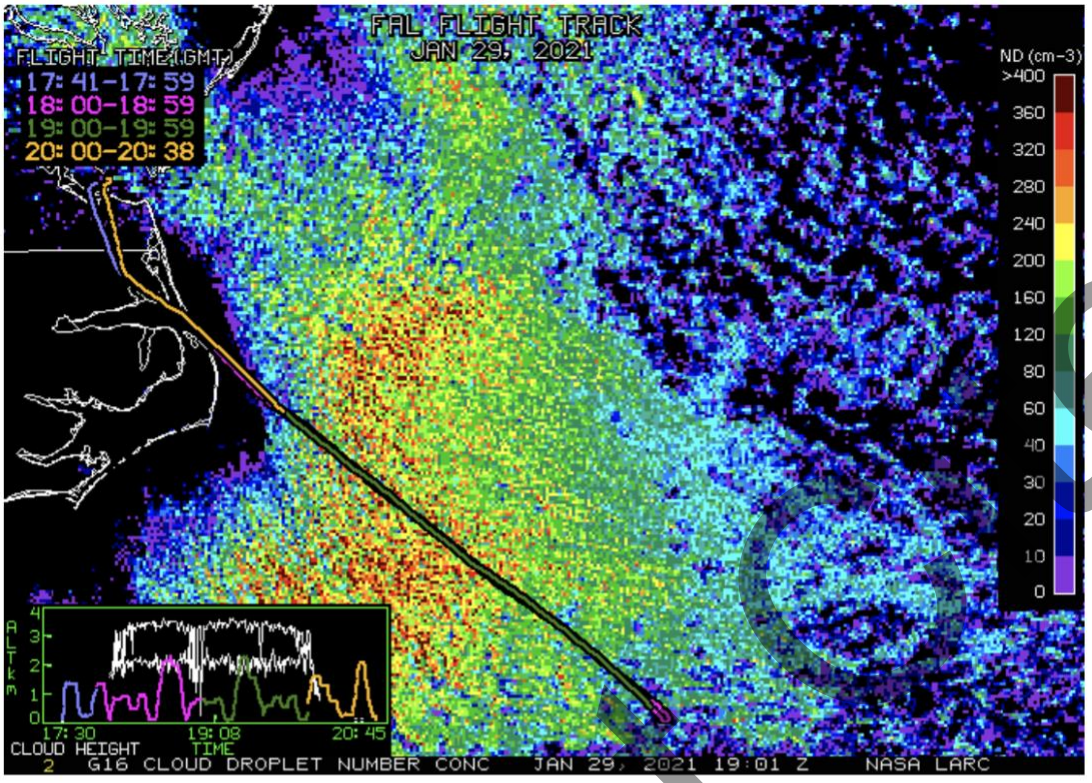
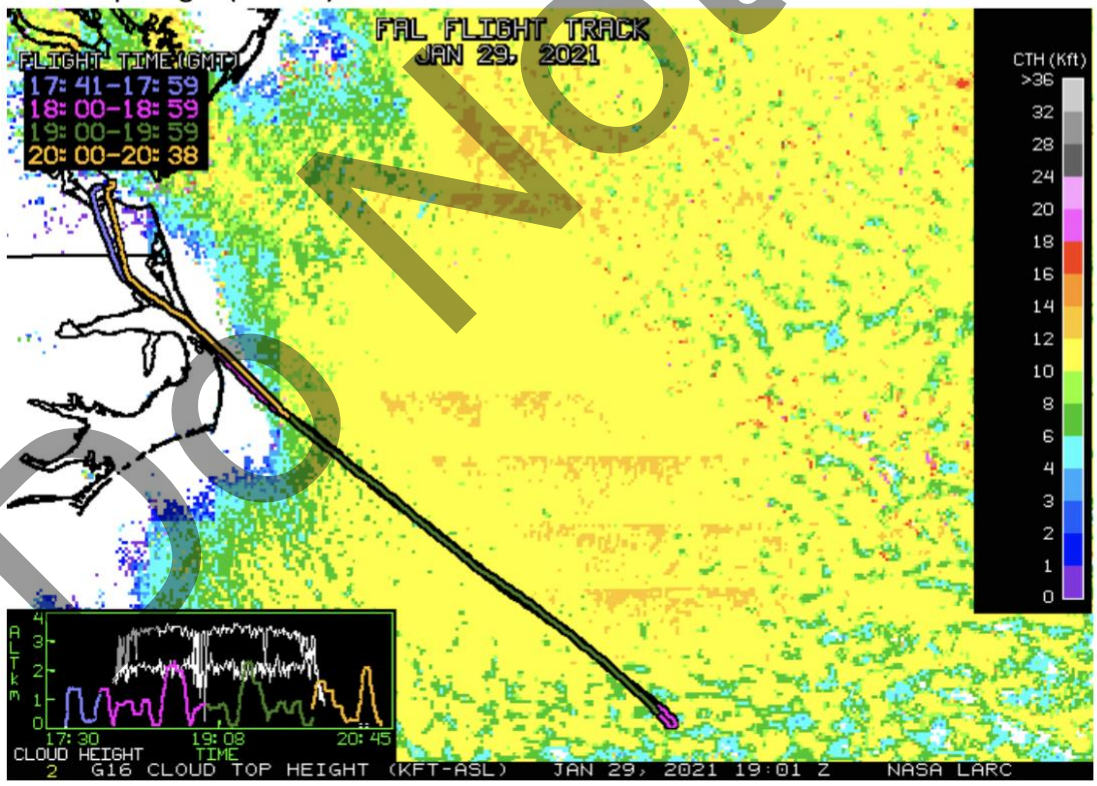
Cloud Droplet Number Concentration (cm-3)



Cloud-Top Height (Kft-ASL)



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