Flight Scientist Report
Friday 03/05/2021 ACTIVATE RF49

Flight Type: Process study flight (1st of 2)
Flight Route: KLFI ATLIC ZIBUT 3570N ZIBUT ATLIC KLFI
Special Notes: This first joint flight is to capture the evolution of the cloud field associated with the cold air outbreak since the transition from closed to open cell (something we want) will be closer to shore and thus reachable with the planes. This flight is mainly oriented in heading to stay along the boundary layer winds direction. The 2nd flight will focus on upwind aerosol characterization.

King Air

Pilot report (Luke Delaney): Science flight for the UC-12 in support of ACTIVATE Campaign #3, conducted cooperatively with the HU-25. Departed Rwy26 and climbed to 28000 ft MSL heading to east oceanic corridor. The weather was clear with a scattered/broken layer at approximately 5000 ft overwater (~50nmi offshore) transitioning to clear overland. Predominant wind from the northwest at 100 knots. Data was collected at 28000 ft MSL for the flight. Several dropsondes were deployed on the route between ATLIC-ZIBUT-37N70W. Executed a turn for RTB about 20nmi prior to the designated Lat/Long due to fuel considerations. Remained with 20 nmi of the HU-25 geolocation throughout the data collection effort. All objectives were achieved and no system discrepancies were noted - pending post-flight data analysis.

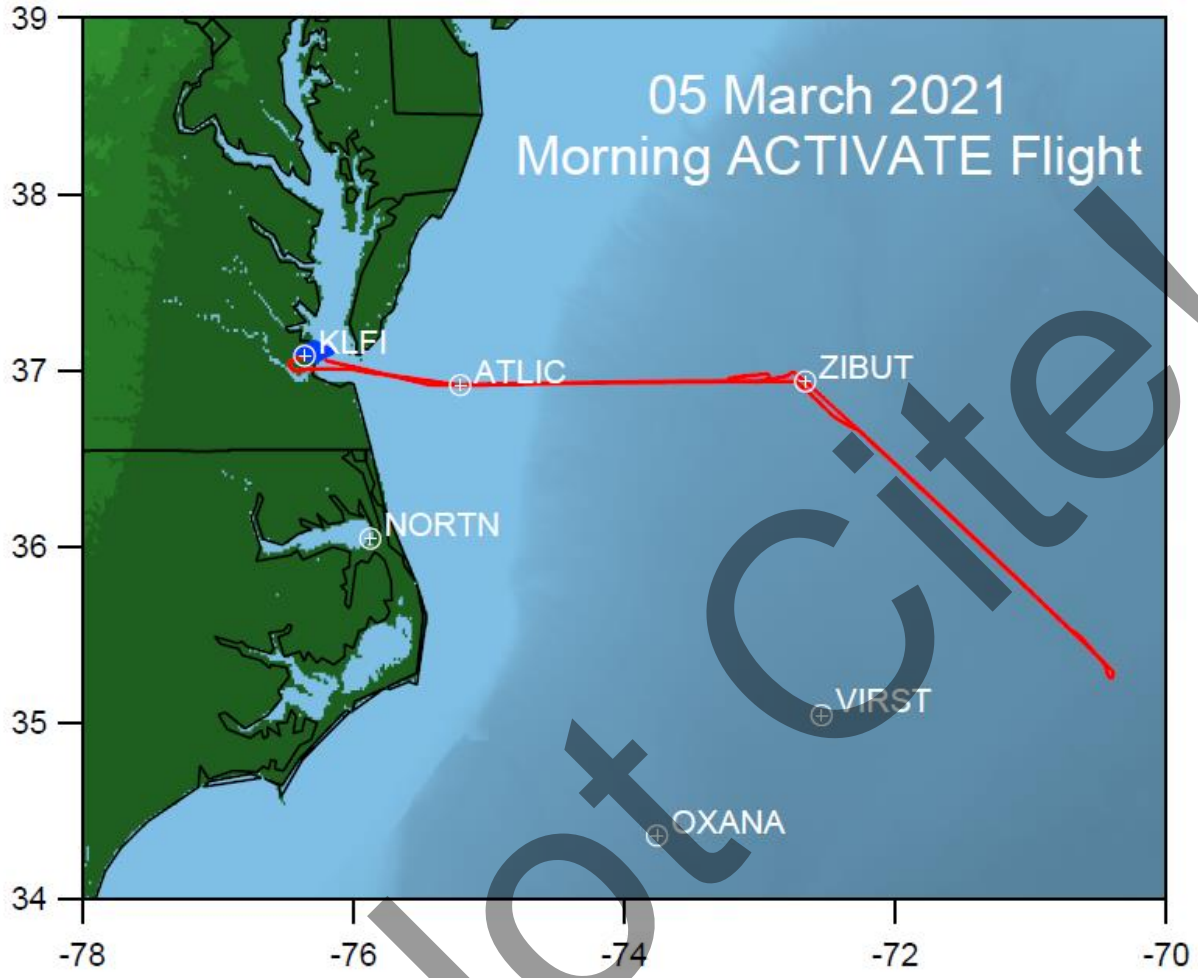
Flight Scientist Report (Taylor S): This morning's flight was the first of a two part series. We took off from KLFI around 0830 EST and transited out to ZIBUT and then proceed to run a downwind (surface wind direction) leg from ZIBUT to the SE. There was a nice aerosol layer aloft near flight altitude at the SE end of this leg. We returned along the same route. A total of 5 sondes were dropped on the flight, spaced fairly evenly in space and time. All instruments were operating nominally. Potential dust layers, but need to confirm with more analysis.

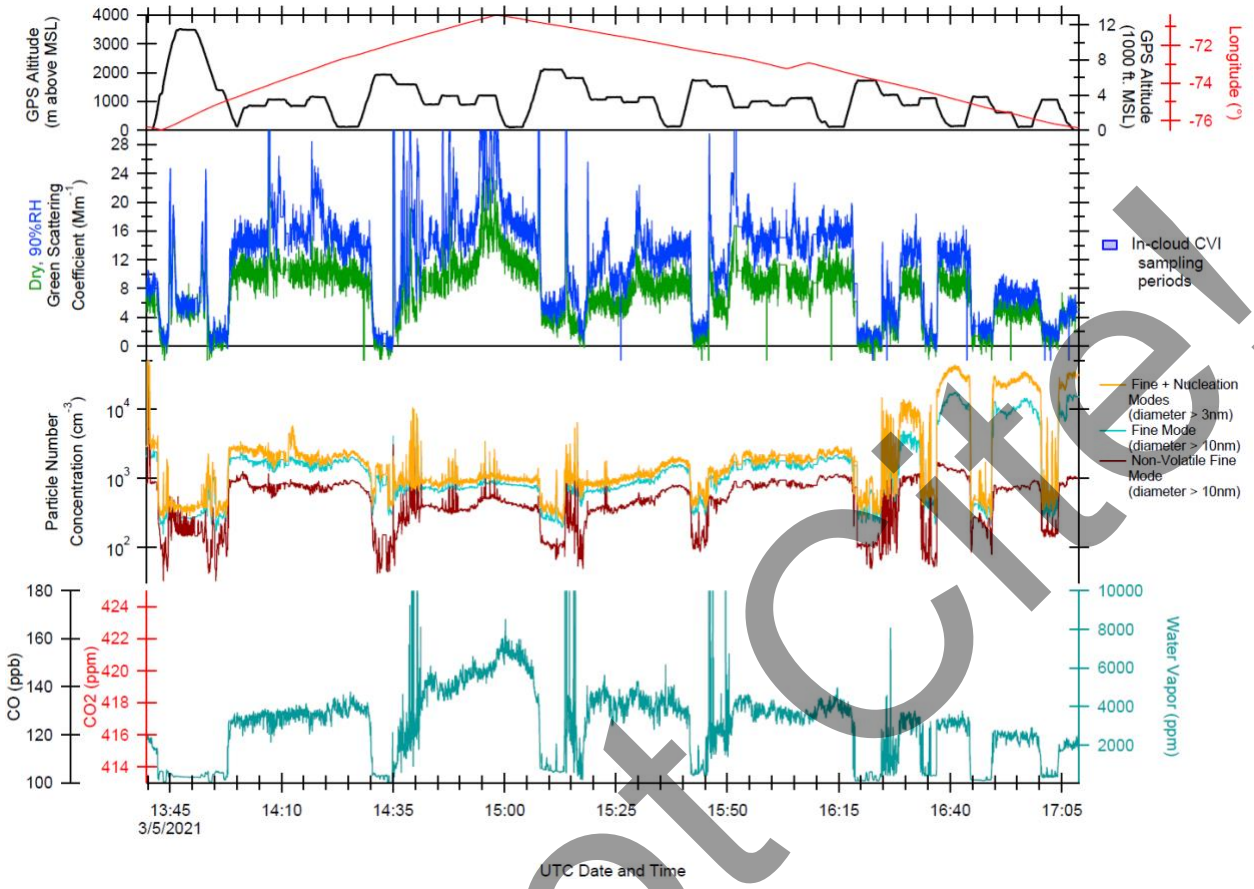
Falcon

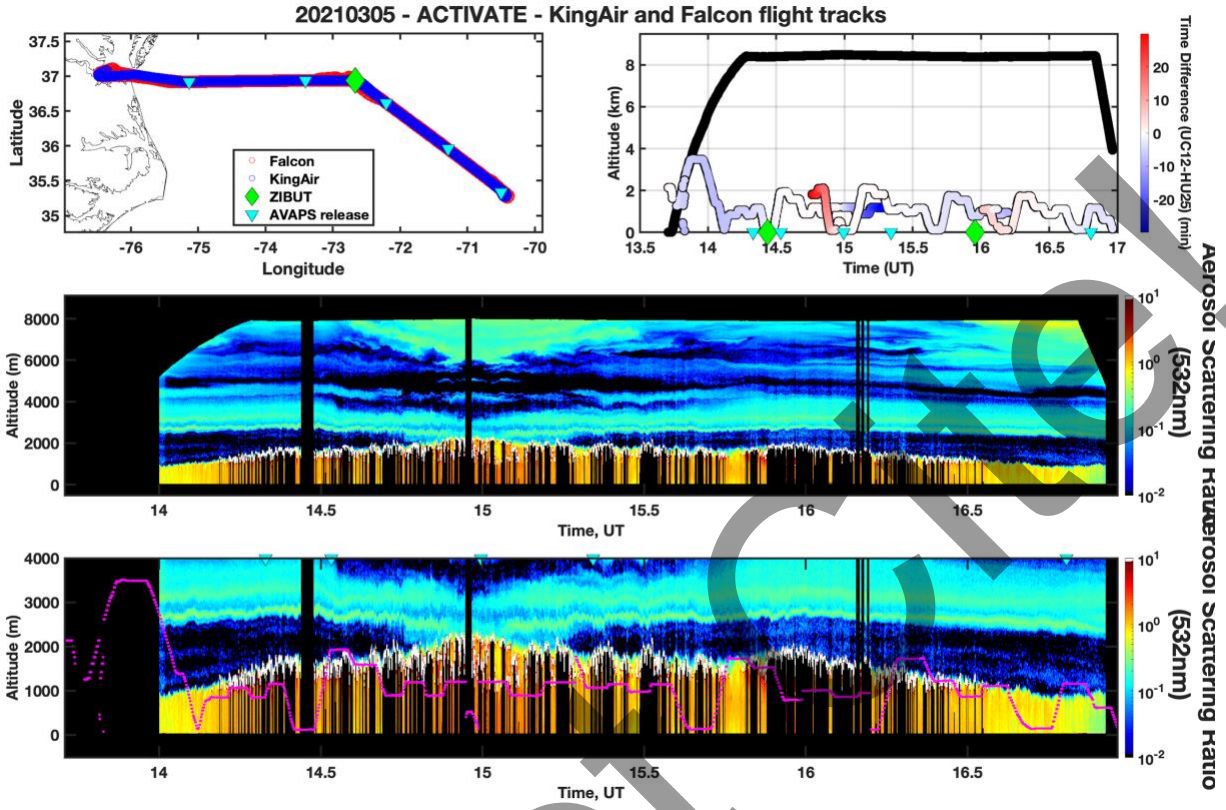
Pilot report (Baxley):
KLFI – KLFI, 3.2 hrs, Slover/Baxley
Clear air and cloud modules, with the aircraft's sampling altitude varying between 500' AGL to 7500' MSL. At reduced electrical power and limited research equipment configuration.

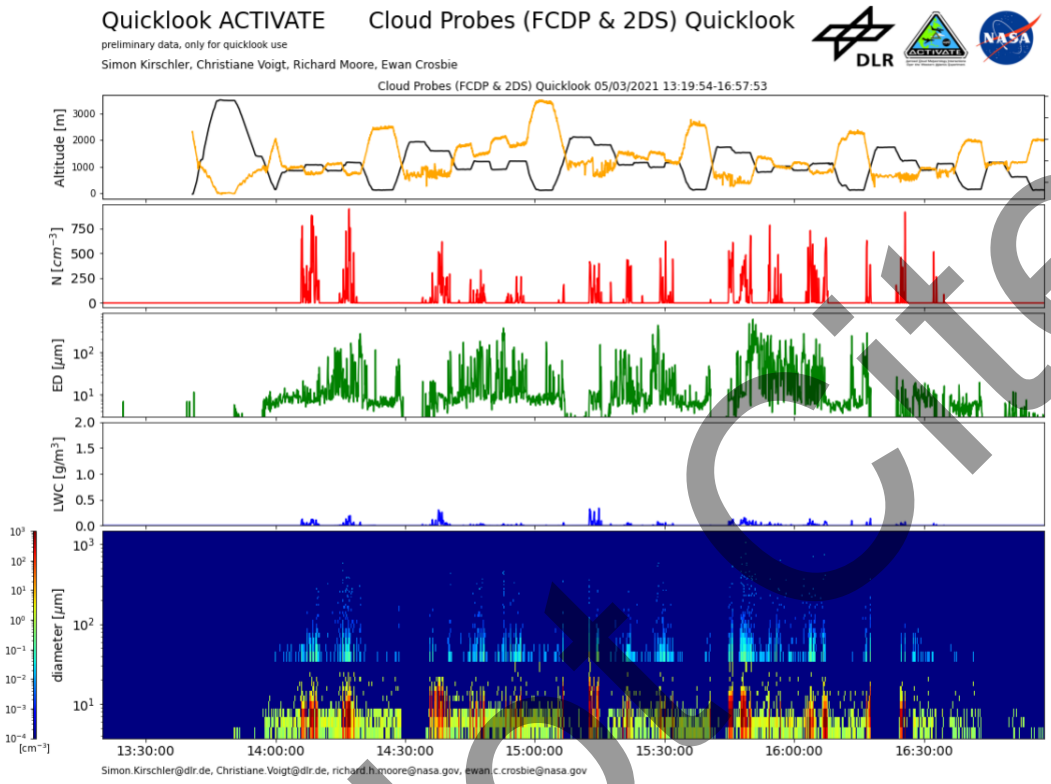
Flight Scientist Report (Ewan): Mostly straightforward standard modules. Transitioned clear-cloudy-clear as forecast. The clouds were well defined with a high base (mostly >3500 ft) and so it was cold (-6C at cloud base in places, cloud top ~-10C). We got a little bit of cloud water on the first flight but it was not great for this because it was too cold when the clouds were good and by the time it warmed up to the SE, the clouds were very broken with low LWC.

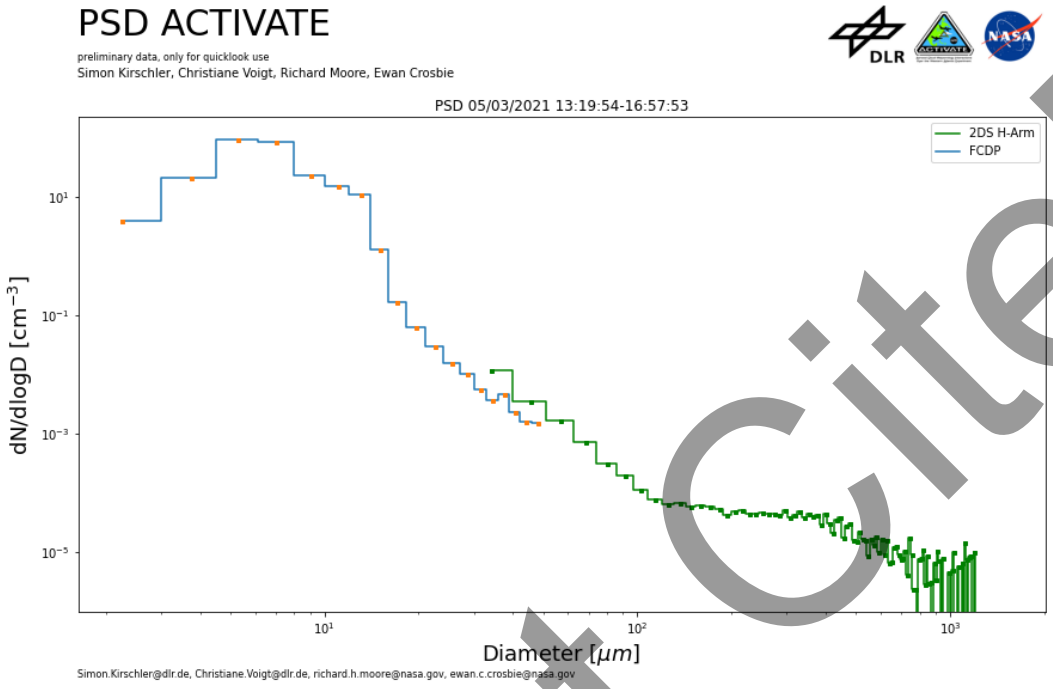
Otherwise instruments worked ok. The 2DS was having software issues again which meant it had to be restarted several times but there should be no impact on data quality. There were some interesting aerosol gradients and contrasts from yesterday. There was extensive enhanced small particle concentrations near the coast with a strong gradient with distance downwind. The marine layer was a bit more developed closer to the coast than yesterday. Scattering was quite a bit less than yesterday. During the first flight there was some evidence of elevated aerosol that we intercepted during the initial climb out but it was ~9000ft and we did not attempt to sample it again as clouds did not extend up above about 6500ft. Cloud conditions were a bit more suppressed on the second flight and so we did not have to go quite as high. This also meant that there was little difference between the BCT and ACB in places.

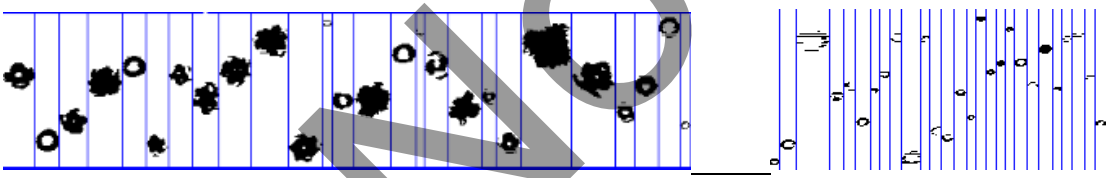

05 March 2021
Morning ACTIVATE Flight
KLFI
ATLIC
ZIBUT
NORTN
VIRST
OXANA
39
38
37
36
35
34
-78
-76
-74
-72
-70


GPS Altitude (m above MSL)
GPS Altitude (1000 ft. MSL)
Longitude (°)
Dry, 90%RH Green Scattering Coefficient (Mm-1)
In-cloud CVI sampling periods
Particle Number Concentration (cm-3)
Fine + Nucleation Modes (diameter > 3nm)
Fine Mode (diameter > 10nm)
Non-Volatile Fine Mode (diameter > 10nm)
CO (ppb)
CO2 (ppm)
Water Vapor (ppm)
13:45
3/5/2021
14:10
14:35
15:00
15:25
15:50
16:15
16:40
17:05
UTC Date and Time


20210305 - ACTIVATE - KingAir and Falcon flight tracks
Latitude
Longitude
Falcon
KingAir
ZIBUT
AVAPS release
Altitude (km)
Time (UT)
Time Difference (UC12-HU25) (min)
Altitude (m)
Time, UT
Aerosol Scattering Ratio (532nm)


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 05/03/2021 13:19:54-16:57:53
Altitude [m]
Static Temperatur [°C]
N [cm⁻³]
ED [µm]
LWC [g/m³]
diameter [µm]
[cm⁻³]
13:30:00
14:00:00
14:30:00
15:00:00
15:30:00
16:00:00
16:30:00
Simon.Kirschler@dlr.de, Christiane.Voigt@dlr.de, richard.h.moore@nasa.gov, ewan.c.crosbie@nasa.gov

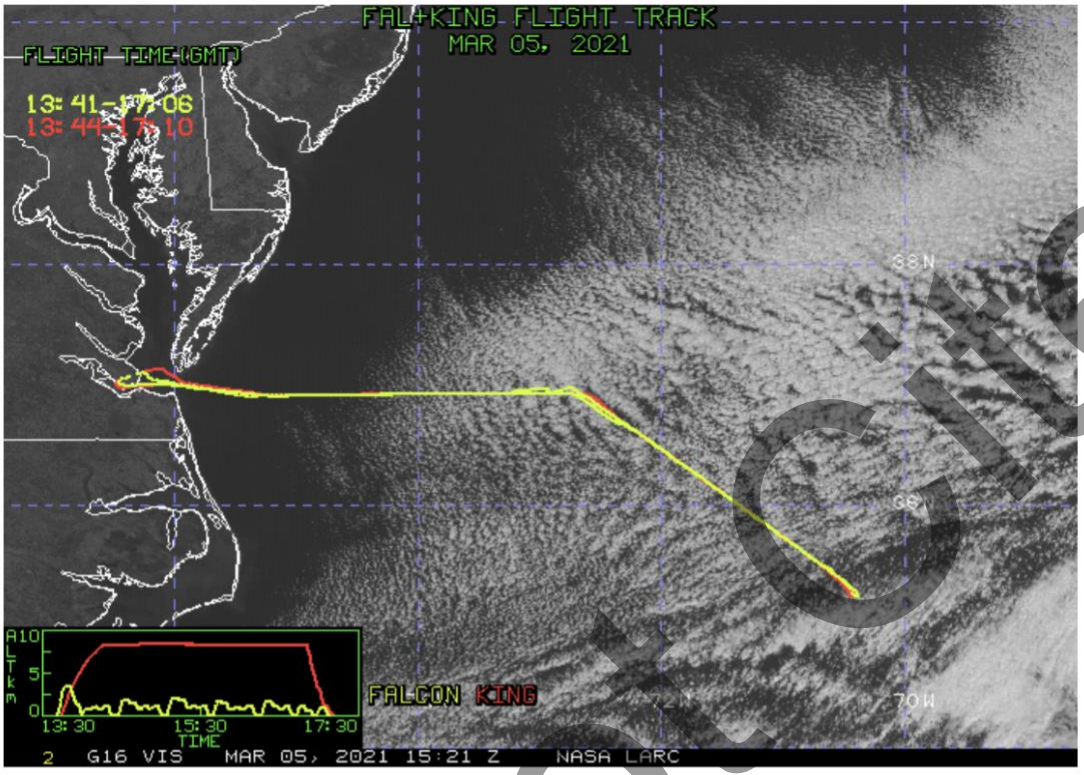




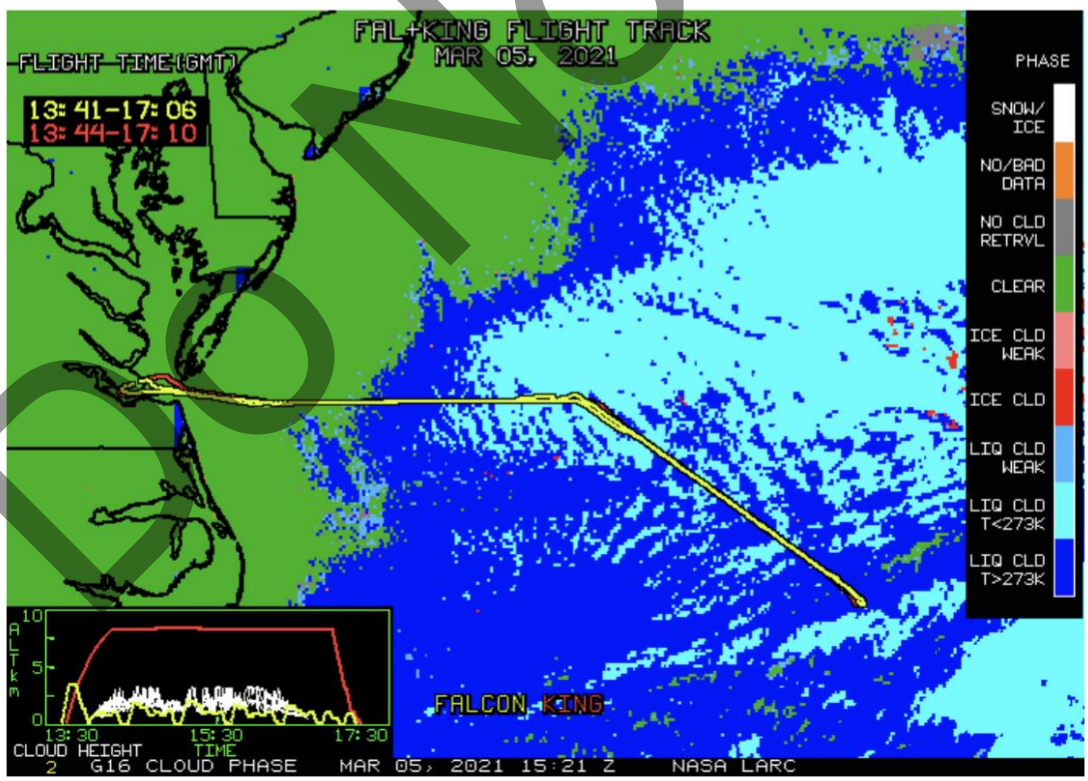
Cloud were almost only mixed phase through the flight. Pure liquid clouds were seen around 16:20 UTC.

NASA-LaRC Clouds Group GOES-16 Quicklook Images for Flight 49, 15:21 UTC Mar 05, 2021

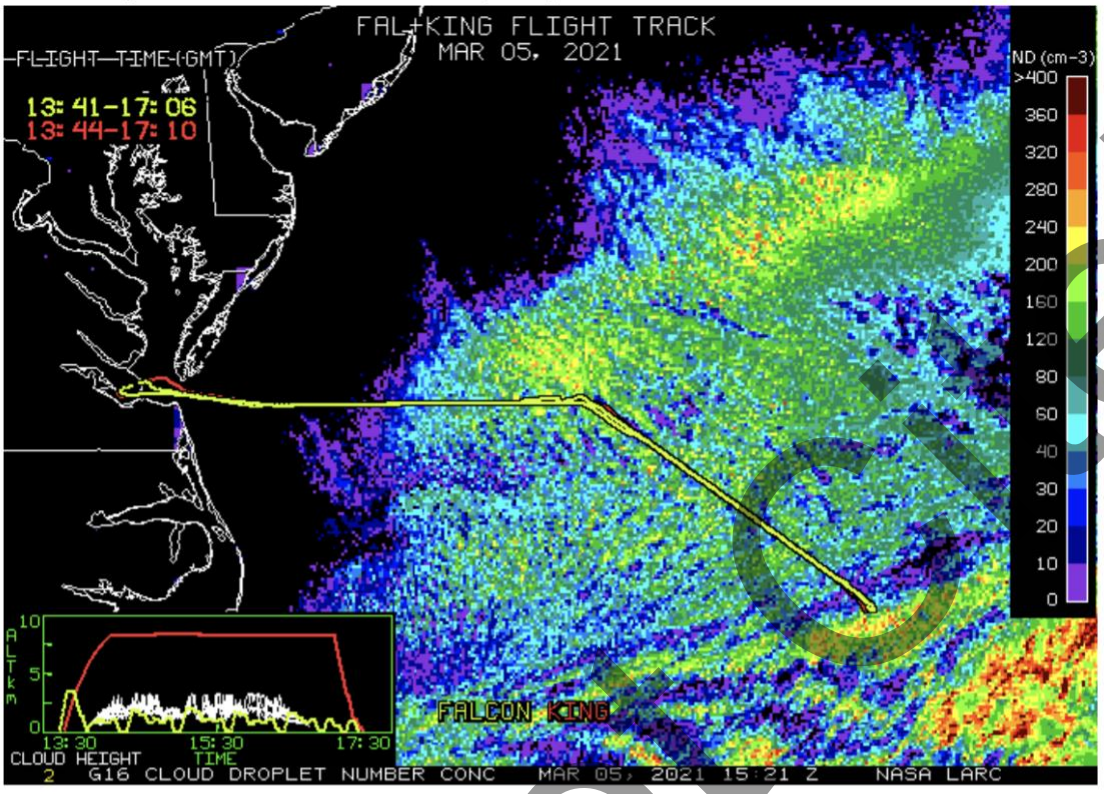
Visible Image



Cloud Phase



Cloud Droplet Number Concentration (cm-3)



Cloud-Top Height (Kft-ASL)