

Flight Scientist Report
Tuesday 6/15/2021 ACTIVATE RF83

Flight Type: Statistical Survey Flight
Flight Route: KLFI ATLIC ZIBUT ISLES ZIBUT ATLIC KLFI
Special Notes:

King Air

Pilot report (Wusk):
Takeoff (Z): 1557 / Land: 1911

UC-12 single flight day; cooperative flight with the HU-25. Planned route: KLFI ATLIC ZIBUT ISLES ZIBUT ATLIC KLFI. Takeoff from runway 08 with HU-25 following 5 mins later. Uneventful departure with climb on course direct ATLIC. Cirrus clouds existed along AR-9. Unable to get below partially due to concerns over ALTRAV just east and south of ZIBUT Surf to FL250. This also required change prior to ZIBUT toward SILLY. After SILLY NE bound descended to FL230 to clear cirrus. Final cruising altitude was FL230 for the leg to and from ISLES. A strong tailwind at high altitude resulted in the UC-12 slowing to help the HU-25 catch up. General coincidence was maintained within 10 minutes. On SW leg, requested amended route MOUGH SILLY CROAK in order better position over the cloud field. Back into some cirrus at the southern end. Requested climb back up to FL260 for final sonde dropped prior to ATLIC. After the sonde drop, commenced descent just east of ATLIC to be at 12,000 by TURET. Normal landing at KLFI runway 08. 4x dropsondes deployed. Crew was Coldsnow, Wusk, Shingler.

Flight scientist report (Shingler): Pervasive cirrus was encountered along track. When able, we descended below the cirrus but ended up with thick cirrus directly above the aircraft. 4 sondes were dropped along the track. First one was deployed at the far end of the track, at the midpoint between the end and ZIBUT, abeam of ZIBUT, and near the COAST.

Falcon

Pilot report (Baxley):
Takeoff (Z): 1602 / Land: 1908

Science flight for the HU-25 in support of ACTIVATE Campaign #4, conducted cooperatively with the UC-12. Route of flight KFLI-ATLIC-ZIBUT-ISLES-ZIBUT-ATLIC-KLFI. Departed Rwy08 direct to ATLIC climbing to 5k ft MSL for initial transit, then descending to 500' MSL approximately 15 nautical miles east of KLFI. Winds were light (<15 kts) out of the west throughout the flight, with distinct areas of clear air, of defined cloud formations, and hazy amorphous clouds. Approaching ISLES the waypoint MOUGH was added between ISLES and ZIBUT to take advantage of cloud formations farther to the west. Coordination with the UC-12 was always

within 10 minutes, with up to 27 nmi separation eastbound proceeding to ISLES, then geolocation within 15 nmi during the return leg. All objectives were achieved and with no discrepancies noted.

Pilots: Slover/Baxley

QNCs: Crosbie/Winstead

Flight scientist report (Crosbie):

This was a challenging flight to execute because the low clouds were quite variable and did not form in a consistent altitude range. There was also extensive cirrus which made it very difficult to visually identify clouds from above and below cloud base, in places the visibility was so low that it was not possible to visually identify cloud base. There was a stratiform layer on the leg between ATLIC and ZIBUT (a small deviation near ZIBUT was made for weather). Below this layer there were some locations with high aerosol scattering ($\sim 100 \text{Mm}^{-1}$) but this generally decayed with distance along track. Past ZIBUT/SILLY, there were no low clouds so we made an attempt to capture the vertical structure of the aerosol by sampling legs at 7000, 5000, 3000, 1500 and MIN. Near the ISLES (north) turn, we encountered stratus and an offset was implemented to try and better sample that cloud region. At the start, the stratus had multiple layers that extended from near surface to 4000, we were able to get under and conduct a BCB but on the second BCB, the leg was terminated because of IMC rules and we were forced to climb to 1000 (which was a convenient ACB). Upon completing the MIN leg, the clouds had gone and it was a clear profile to a nominal ACT. Thereafter, there was a period where we just seemed to be out of sync with the clouds and always ended up missing what little there was. The return leg through the stratiform inbound to ATLIC also provided a couple of in cloud legs but the breaks in the clouds were not sufficient to get BCB. Upon climbing to ~ 4000 , we transited a region of higher cloud tops and then there was an abrupt boundary which left us ACT. After descending to try and get a BCT leg, the clouds abruptly ended. (3 part cloudy, non-standard clear sampling to try and capture aerosol above boundary layer, and hybrid cloud/clear sampling that was out of sync with clouds)

Eddie:

Takeoff: 16:03:25

Landing: 19:07:04

Before takeoff, DAQ software was restarted to get REVEAL serial feed.

16:03:25 Takeoff

16:20 Had to climb from 500 ft because of low clouds.

16:26 Scattering over 100

17:10 Very hazy, particularly west

17:32:30 Encountering very light rain

17:53 Messy cloud scene; Hard to distinguish from background

18:32 Can't go below 1000 ft because of low clouds

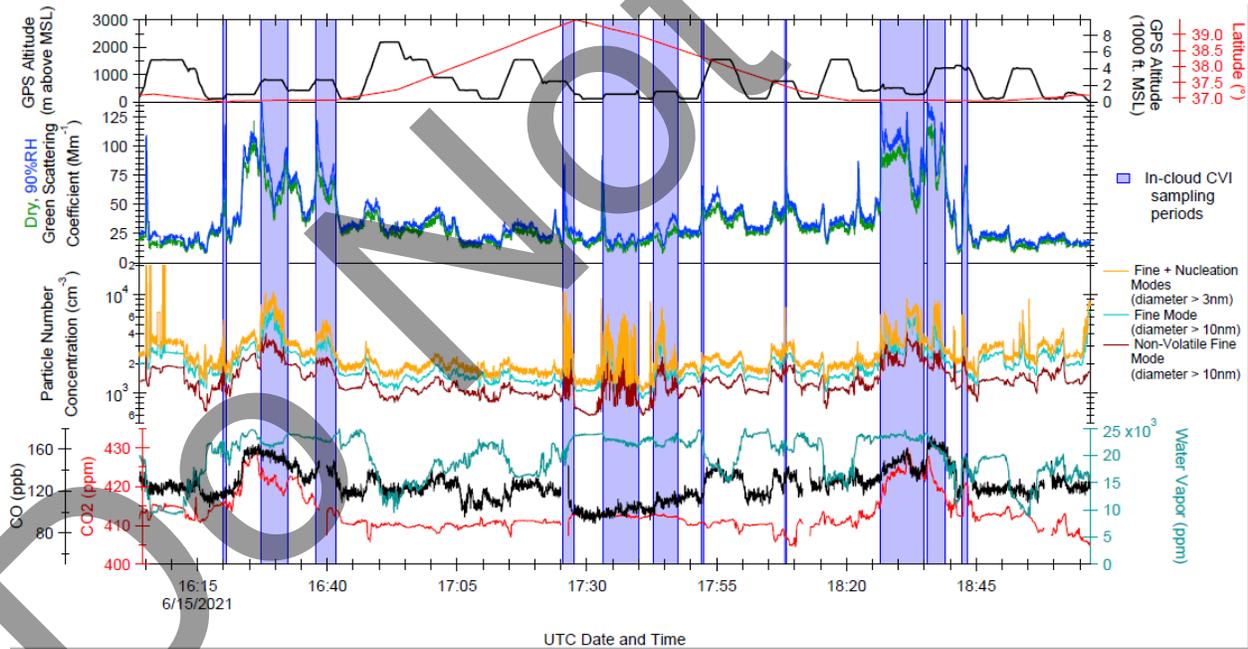
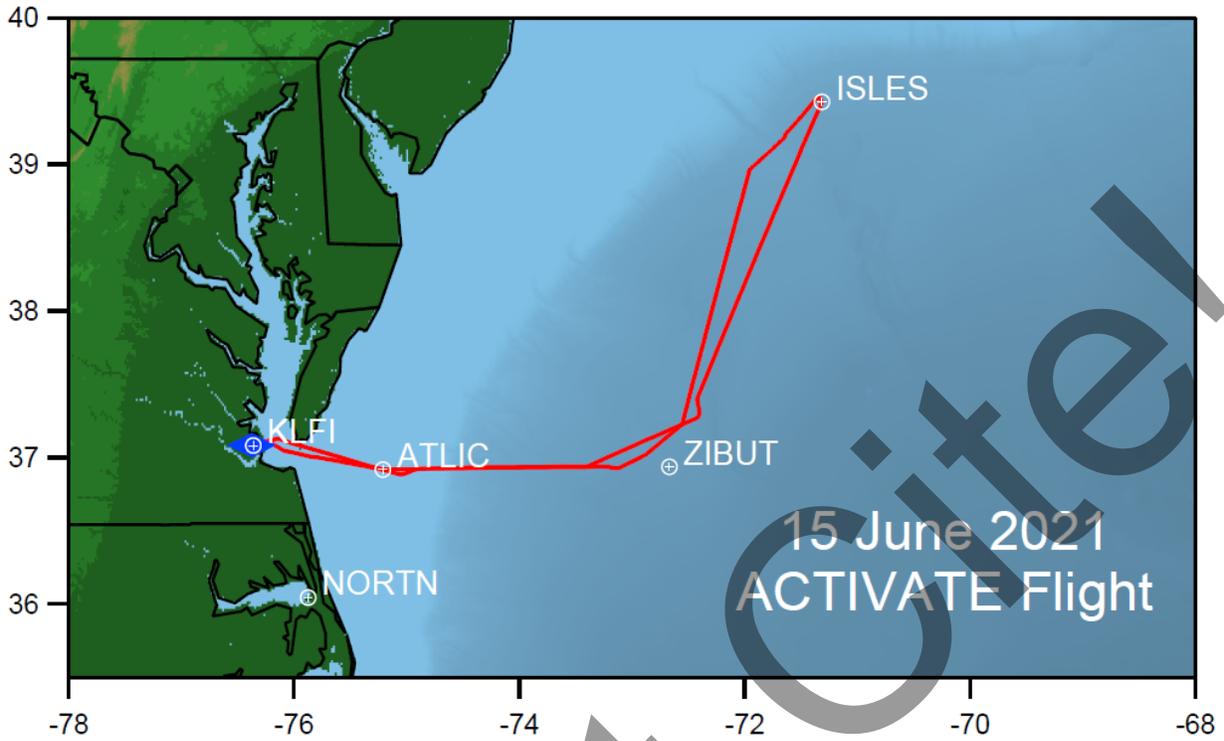
18:35:30 Multiple layers of clouds

18:38 Well defined clouds now

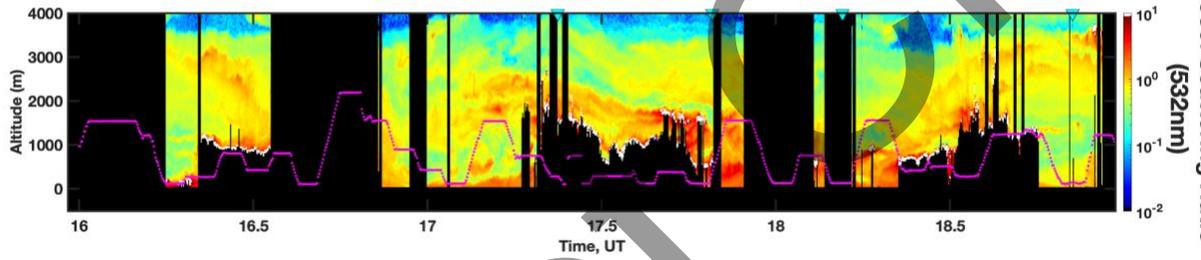
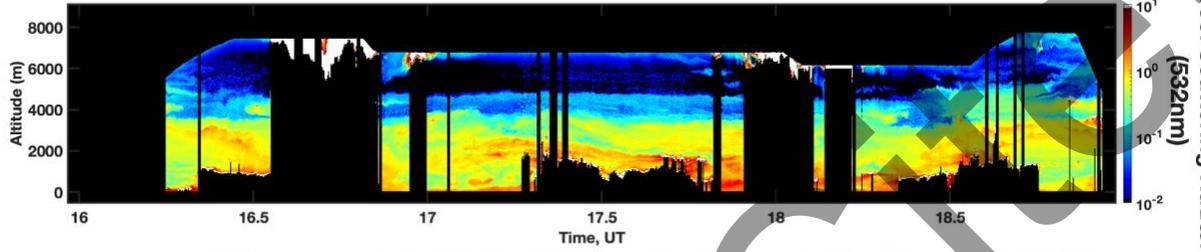
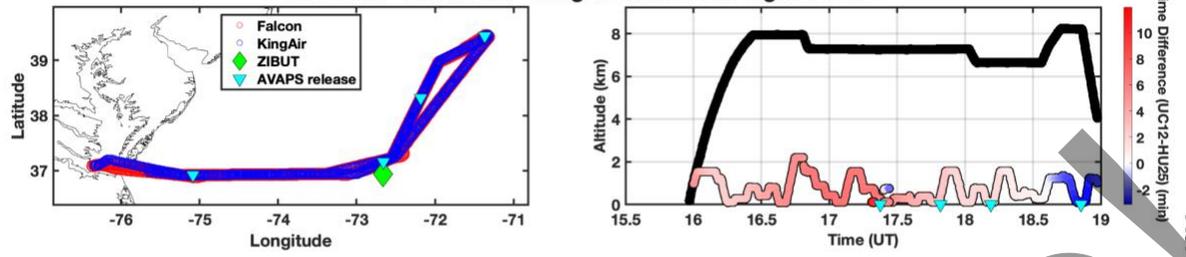
19:02:15 Humidifier & WCM turned off in preparation of landing

19:07:04 Landing

Do Not Cite!



20210615 - ACTIVATE - KingAir and Falcon flight tracks



Aerosol Scattering Ratio (532nm)

Do Not

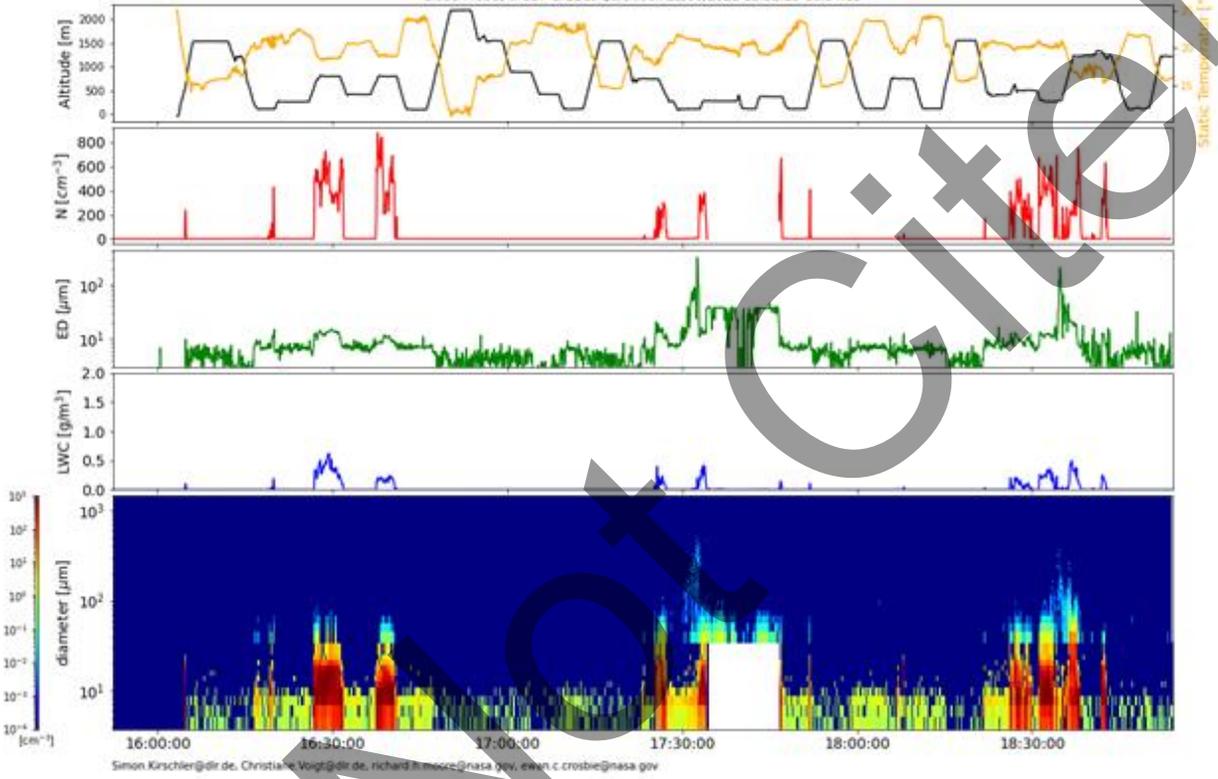
Quicklook ACTIVATE Cloud Probes (FCDP & 2DS) Quicklook

preliminary data, only for quicklook use

Simon Kirschler, Christiane Voigt, Richard Moore, Ewan Crosbie



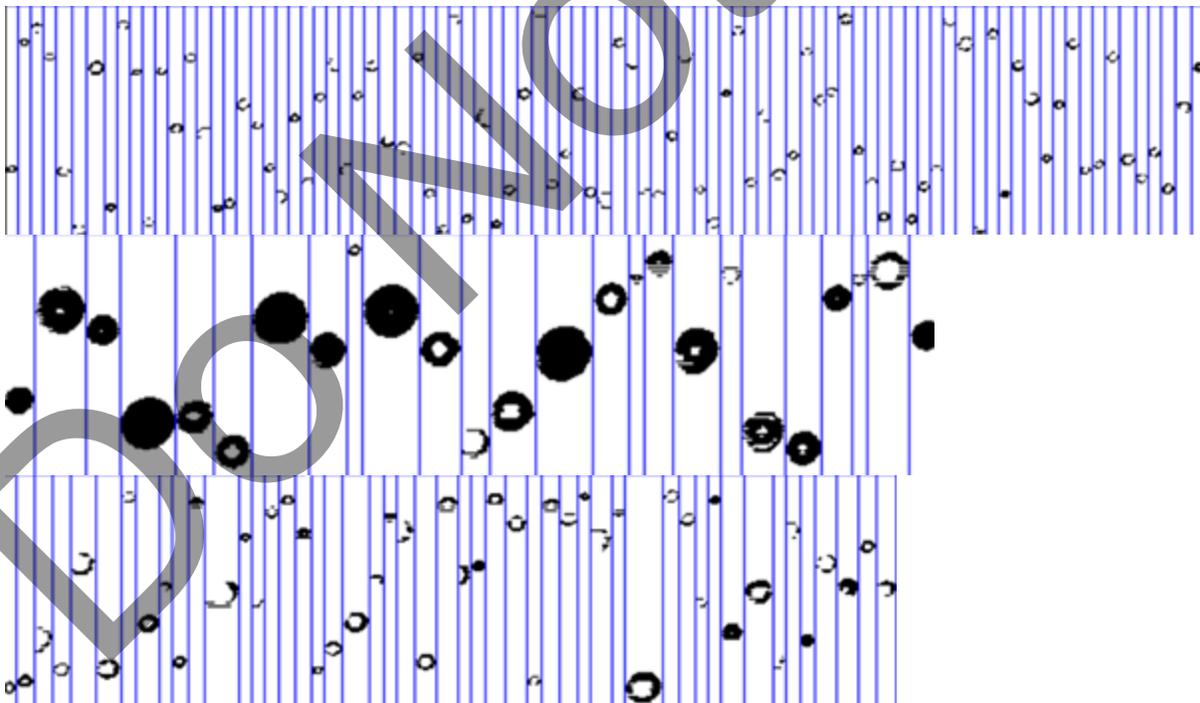
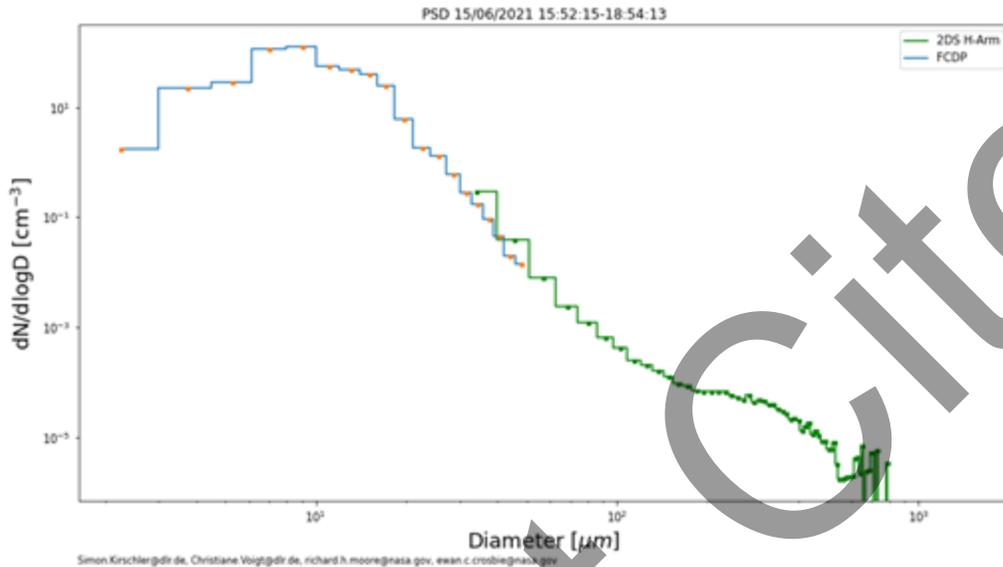
Cloud Probes (FCDP & 2DS) Quicklook 15/06/2021 15:52:15-18:54:13



Do Not Cite!

PSD ACTIVATE

preliminary data, only for quicklook use
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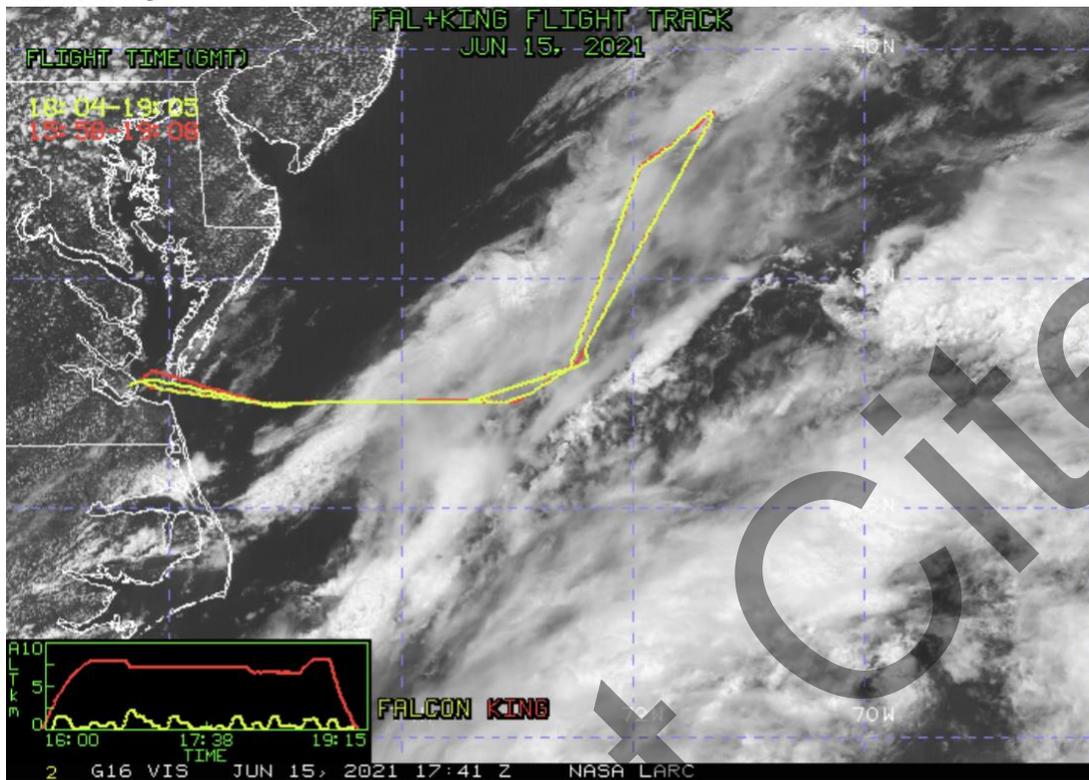


Only pure liquid clouds.

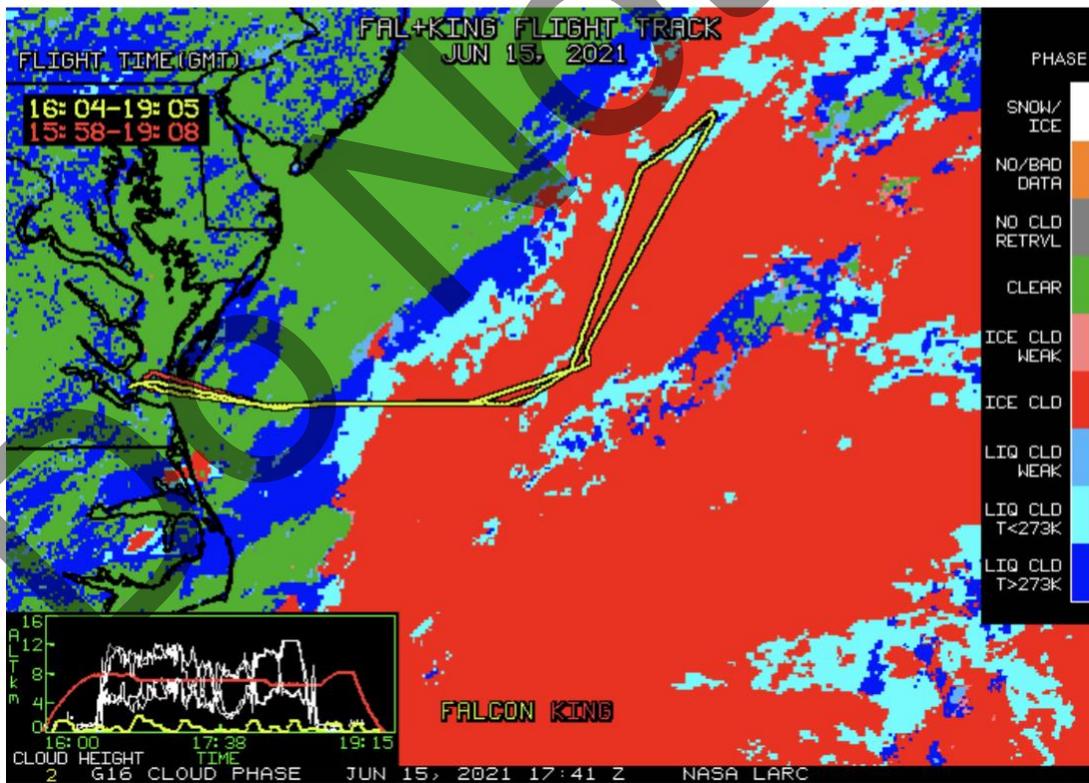
NASA-LaRC Clouds Group GOES-16 Quicklook Images for Flight 83, 17:41 UTC Jun 15, 2021

Do Not Cite!

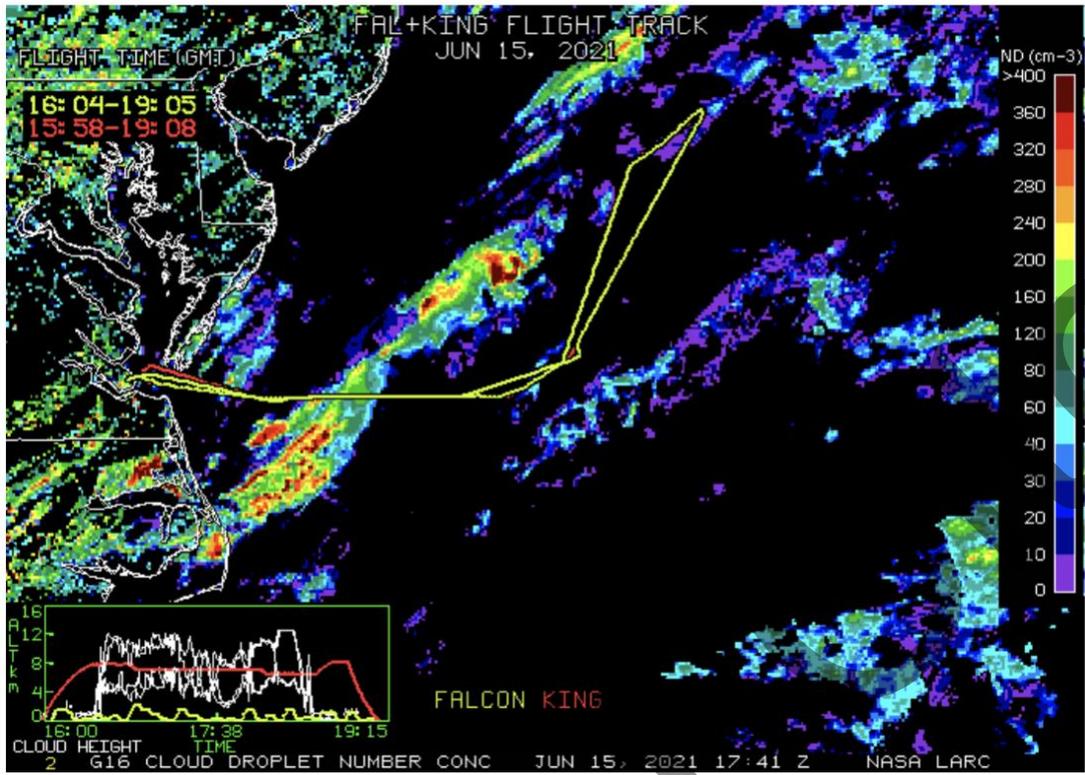
Visible Image



Cloud Phase



Cloud Droplet Number Concentration (cm-3)



Cloud-Top Height (Kft-ASL)

