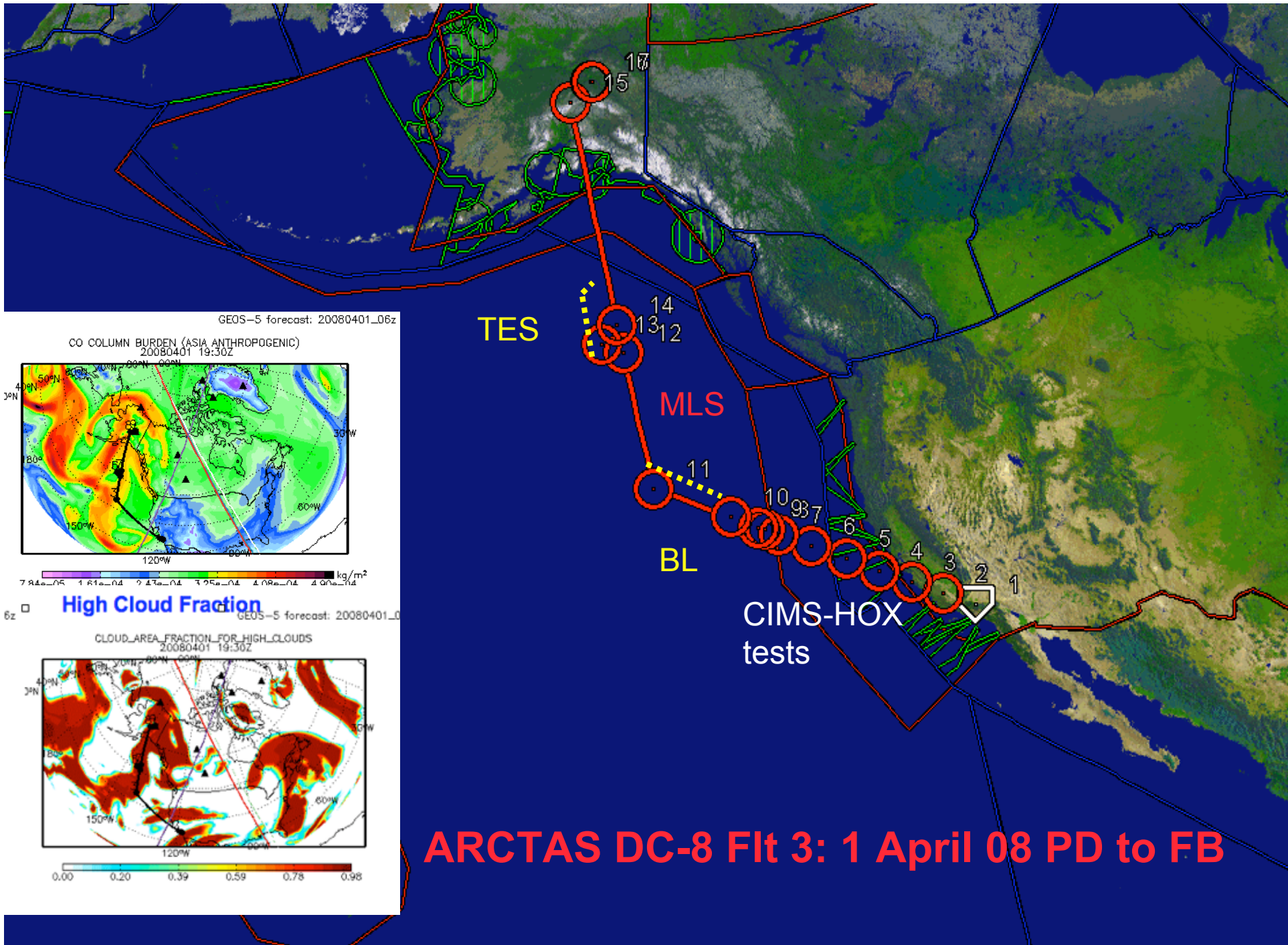


ARCTAS DC-8 Flight 3 (Science/Transit Flight; April 1, 2008; Tuesday)

This was the first ARCTAS science/transit flight of the DC-8 starting from Palmdale, CA and ending at Fairbanks, AK. The objectives were to provide opportunities for a key instrument to make several tests, validate Aura satellite instruments (TES and MLS), and sample Asian pollution influences along the flight track. The nominal flight tracks and Way Points (WP) are shown in the slide below but these were modified in-flight to take advantage of specific opportunities and to avoid clouds. Take off time was 1100 h (LT-Palmdale) and the flight duration was 7.0 hours.

Near the surface, major pressure systems were 1) a low off the California Coast, 2) high pressure off the coast of British Columbia, and 3) broad low pressure over the Gulf of Alaska. A frontal system extended south from this Gulf low, and there was widespread multi-level cloudiness associated with it. The upper level flow consisted of low pressure troughs extending north-south near the Aleutians, and another just off the coast of California. A high pressure ridge was located between the troughs. Strongest winds along the flight track were off the coast of California; winds elsewhere were quite weak for this time of the year.

This was a good flight and we were able to meet all our objectives. With the exception of CIMS-HO_x, all of the instruments aboard the DC-8 performed normally and collected data. The initial portion of the flight (north westerly; points 3-11) was primarily dedicated to tests required by the CIMS-HO_x instrument. The DC-8 did level flights of about 15 minutes duration between 15 and 34 Kft at about 5 Kft increments. These tests were successful and are expected to facilitate the full operation of CIMS-HO_x. At 34 Kft we encountered stratospheric influences with ozone levels approaching 220 ppb and detectable reductions in N₂O and CO. Subsequently (WP 10-11) the DC-8 descended to the boundary layer (0.5 Kft) and observed oceanic deposition of several OVOC and nitriles. BrO was below detection (< 1ppt) both in the marine boundary layer and the sampled stratospheric intrusion. After the boundary layer run the DC-8 climbed back up to 28 Kft following the MLS track in the northerly direction. There was evidence of Asian pollution and dust flying at 28 Kft as predicted by models (see attached Lidar images). We encountered increasing cloudiness at all levels as we moved north although the cloud system had moved east allowing reasonable Lidar coverage above 15 Kft along the TES track which was about 90 miles west of the MLS track. The TES full spiral was aborted because of excessive cloudiness below 15 Kft. After the TES validation the DC-8 was diverted back to the MLS track where we continued to observe pollution and dust influences between 23 and 30 Kft. Mixed dust and urban pollution was encountered throughout this flight although the plumes appeared to be sufficiently diluted (Max CO-170 ppb). Excessive cloudiness interfered with our plans for satellite verifications as we flew northward along the cloud band. We approached Fairbanks at 30 Kft and spiraled down before landing with the AMS instrument reporting high organic aerosol concentrations during descent.

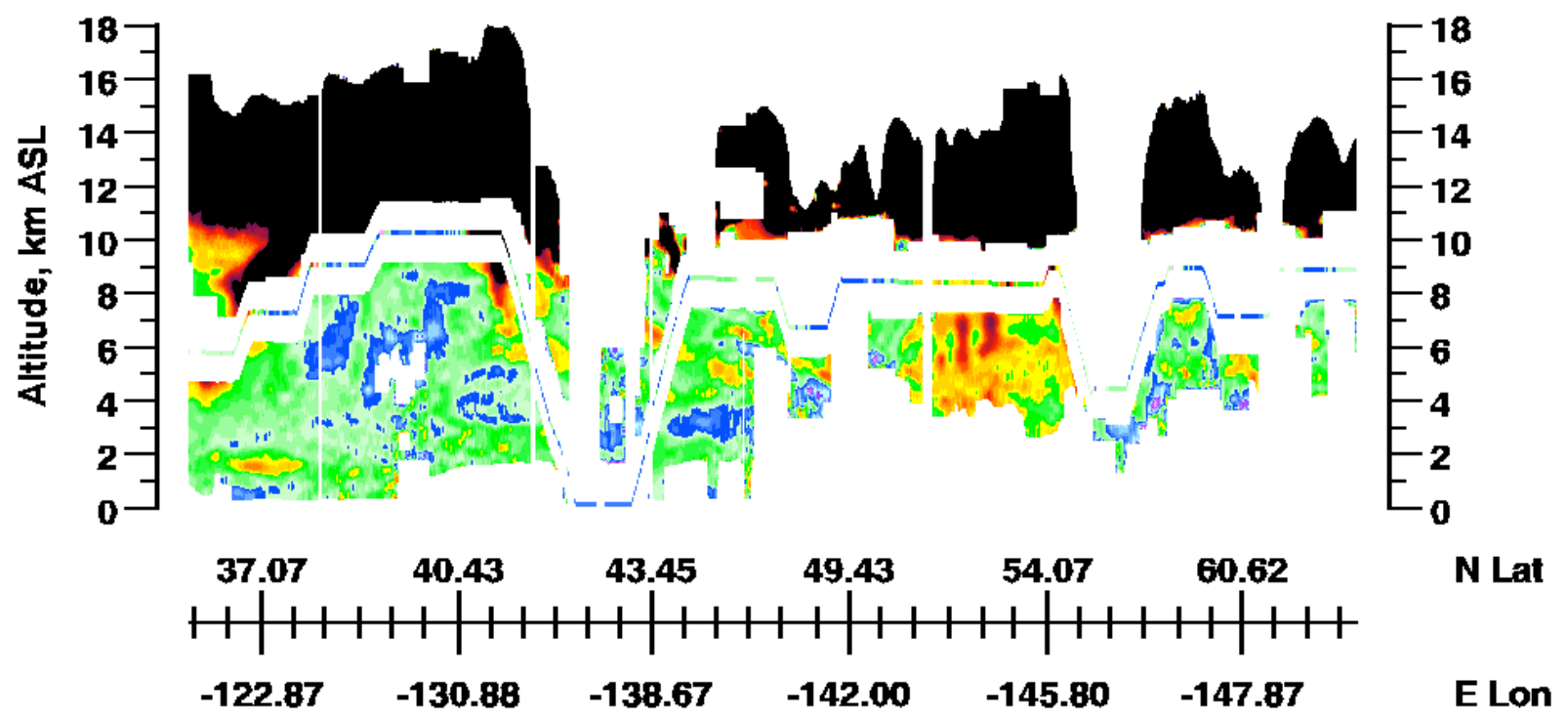
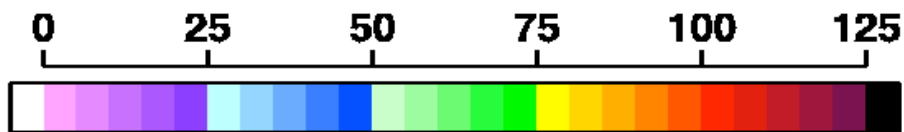


ARCTAS / DIAL Field Data

Palmdale, CA to Fairbanks, AK
Flight 3

1 Apr 08

Ozone (ppbv)

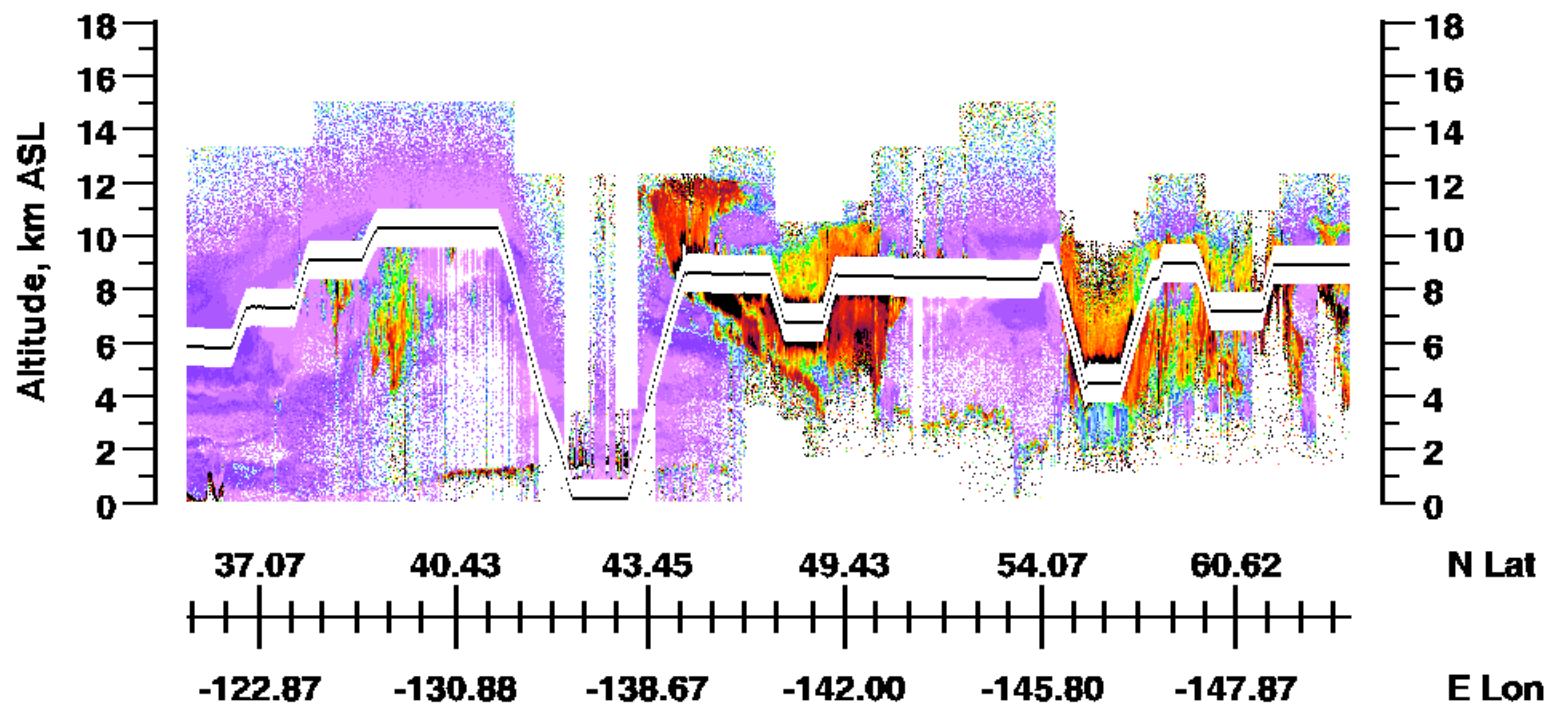
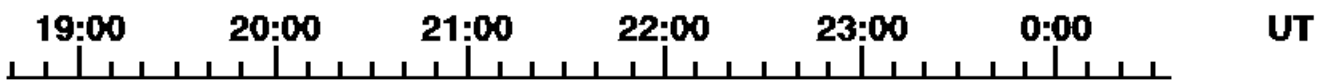
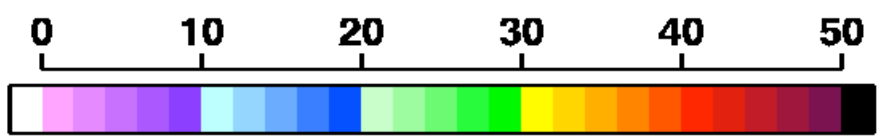


ARCTAS / DIAL Field Data

Palmdale, CA to Fairbanks, AK
Flight 3

1 Apr 08

Total Depolarization %



ARCTAS / DIAL Field Data

Palmdale, CA to Fairbanks, AK
Flight 3

1 Apr 08

Aerosol Scattering Ratio (591 nm)

