

INTEX-B: Flight 10 (Science/Transit Flight; April 17, 2006; Monday)

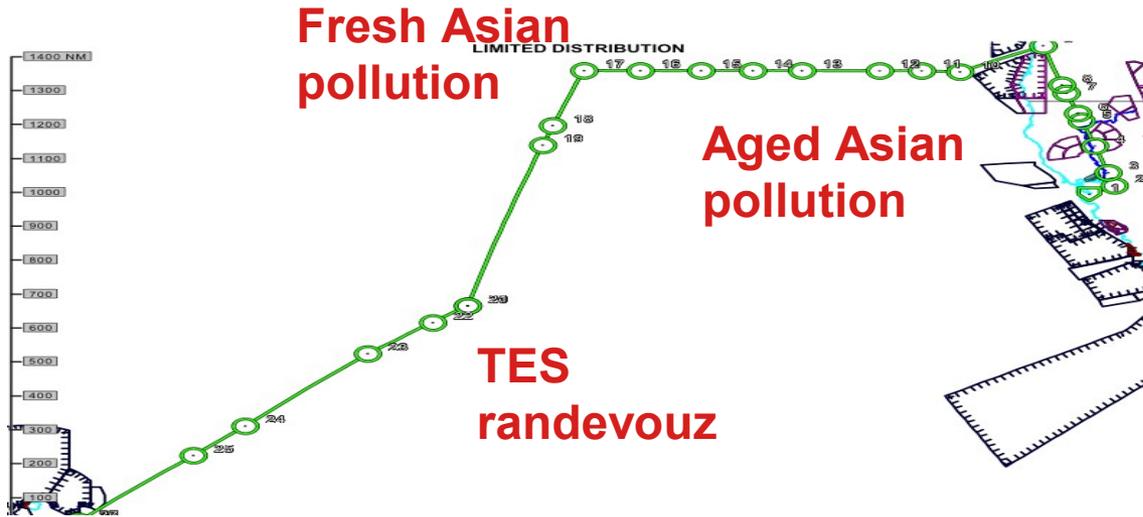
This was the eighth INTEX-B science/transit flight that started from Moffett Field, CA and concluded at Hickham AFB, Hi. The principal DC-8 objectives for this flight were inter-comparison with the C-130, sampling of aged and fresh Asian pollution over the Pacific, and validation of TES and OMI observations. The primary objective for the C-130 was inter-comparison with the DC-8 due to the limited duration of the C-130 flight. The nominal flight tracks and profiles for both the DC-8 and the C-130 are shown in the slides 2 and 3 below but these were modified in-flight to achieve timed coincidence with the C-130 and the Aura satellite overpass. The major pollution features expected along the flight paths are shown in slides 4-5. Takeoff time for the DC-8 was 10 am (LT) and the flight duration was 9 hours.

Most of the instruments aboard the DC-8 performed normally throughout the flight and atmospheric conditions were ideal to achieve stated objectives. A few of the instruments encountered technical difficulties (e. g. GT-LIF, UC-LIF) and did not operate a significant fraction of the time. The impact on overall science was minimal because alternate measurements on the DC-8 are available to fill these gaps (e. g. NO₂ can be derived from NO). As the DC-8 headed west and then southwest toward the satellite point, it encountered large areas of mostly low and high clouds. Winds along these legs were mostly from the west. The area west of the front (the cloud area) typically is a region of sinking air (the dry intrusion), and the DC-8 found this area to be dry with indications of a stratospheric influence. The clouds began to diminish as we approached the satellite spiral point near 32N, 144 W. Conditions from the spiral point to Hickham gradually changed to tropical characteristics.

This was an excellent flight and we were able to meet all our objectives. We climbed out of Moffett Field in the north westerly direction to meet up with the C-130 for a 3-leg (7 kft, 12 Kft, and 20 Kft) inter-comparison. Due to some communication difficulties with the C-130 the first leg had to be scrubbed but the next two leg inter-comparison went off excellently with the C-130 within about 1000 ft of the DC-8 and ideal atmospheric conditions providing a large dynamic range in concentrations. At the 20 Kft inter-comparison leg there were stratospheric influences with extremely dry air (H₂O- 50 ppm) and O₃ as high as 130 ppb . After the inter-comparison we headed west profiling the Pacific troposphere along 40 N all the way to 140 W. There was pollution throughout the region and indications of dust. CO concentrations in excess of 250 ppb (O₃- 60 ppb) were observed at 23 Kft. The boundary layer was very clean with nearly constant O₃ of 40 ppb below 2 km. Heading further west we encountered high O₃ coexisting with dust (super micron aerosol and high depolarization) in the middle troposphere in mid-Pacific possible resulting from dust storms in China. The strong westerly winds were ideal for transporting dust over the central Pacific and beyond. Lidar images (slides 6 and 7) showed that much of the troposphere contained high O₃ mixing ratios. At higher levels enhanced CO coexisted with stratospheric O₃ suggesting lofted Asian pollution. Prior to the satellite rendezvous point we headed south and climbed to 35 Kft before spiraling down under the TES overpass point at 2245 UT under relatively cloud free conditions. On this southerly leg the entire troposphere once again contained high O₃ levels of 60-80 ppb although there was no indication of the presence of dust (slide 7). After completion of the satellite spiral the DC-8 sampled marine boundary layer and climbed to 33 Kft to head for Hickham AFB encountering pollution layers at 10-20 Kft prior to landing in Hi.

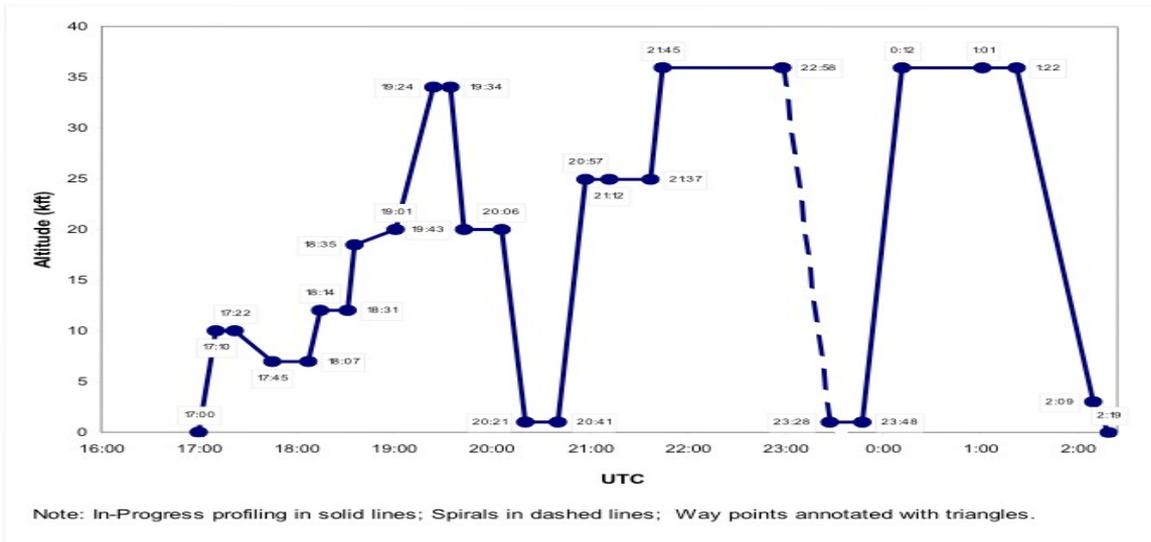
ICATS archived data files for INTEX-B are available at: <http://www.nasa.gov/centers/dryden/research/AirSci/DC-8/ICATS/FY06/INTEX-B/index.html>

DC-8 Flight 10- California to Hi 4/17/06

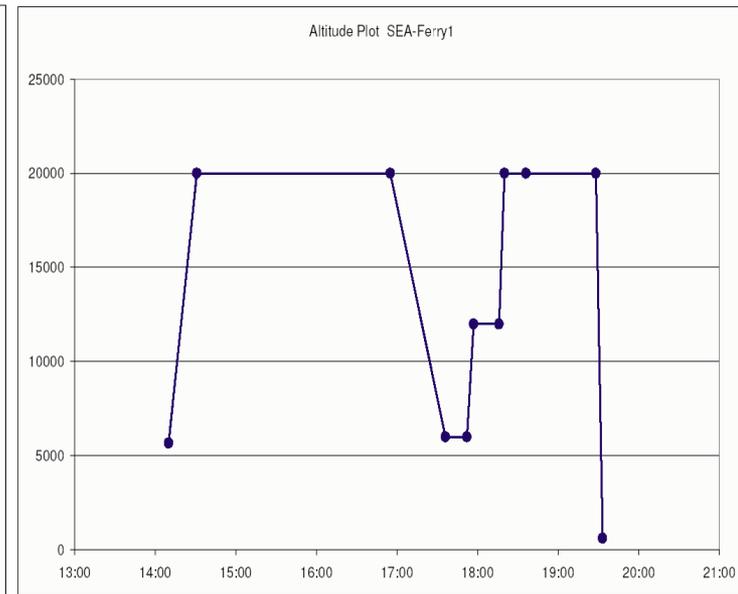
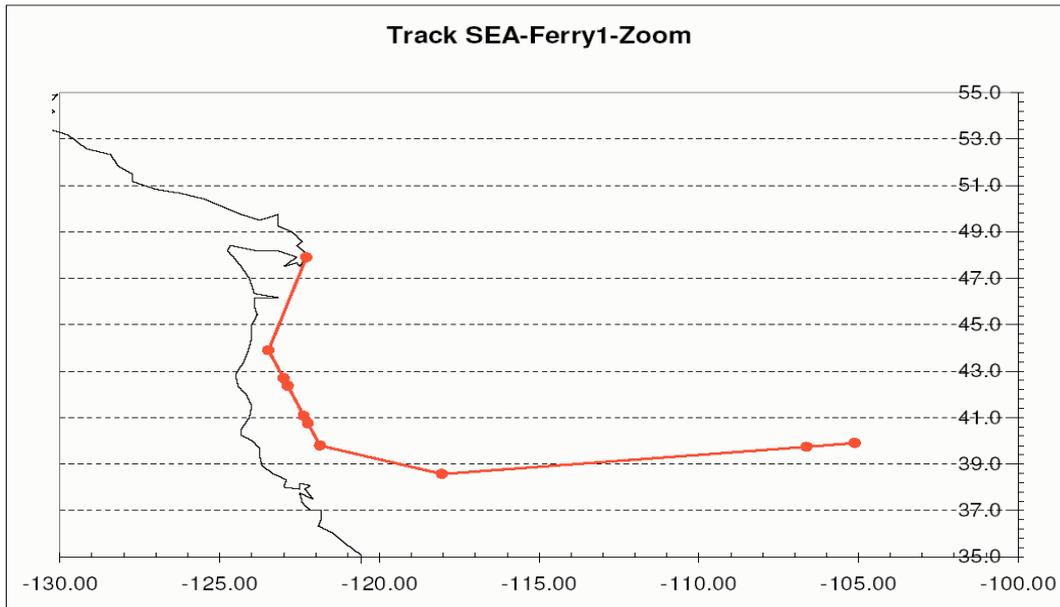


C-130 Intercomparison

**T. O. 10 am
Flt. Time 9 hrs**

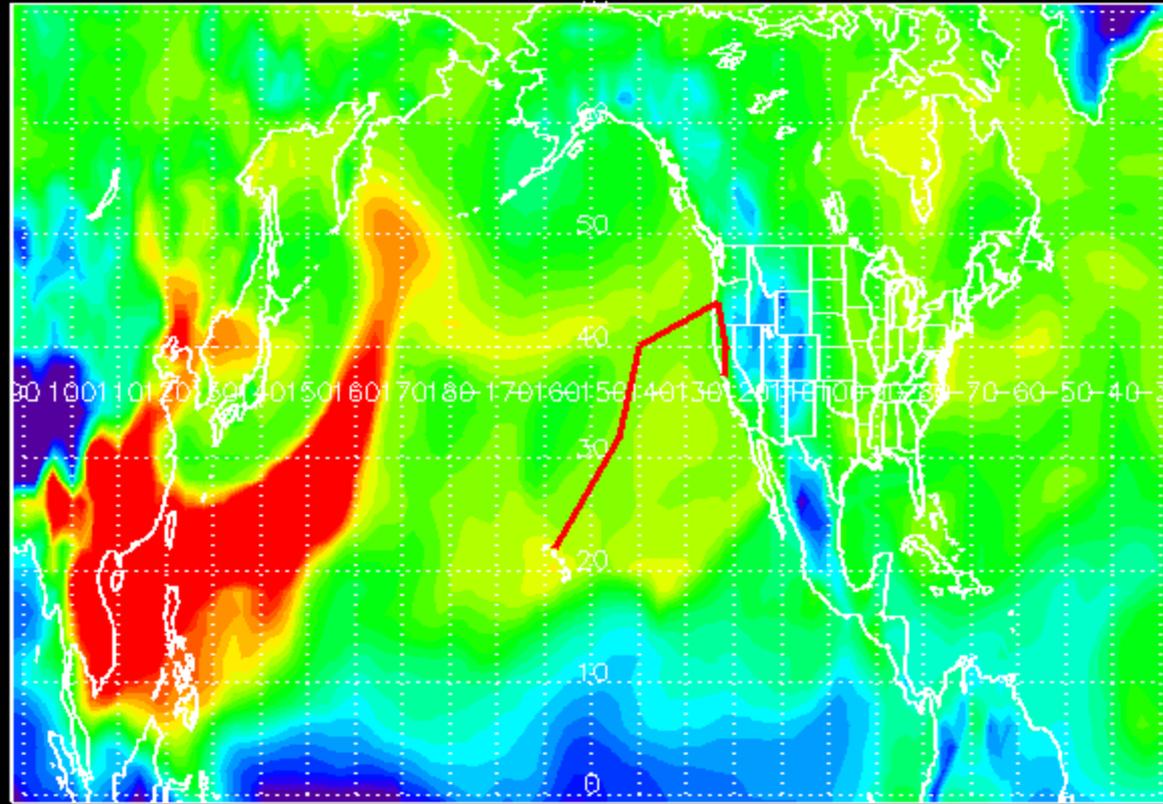


C-130 Ground Track 4/17/06



RAQMS 30hr DC8 CO Fx valid 18Z 04/17/06

RAQMS SFC-Trop CO Column18Z 20060417



0.5 1.0 1.5 2.0 2.5
(10^{18} mol/cm²)

RAQMS_c 24hr ASSIM + 30hr Fx Initialized 18Z 20060417

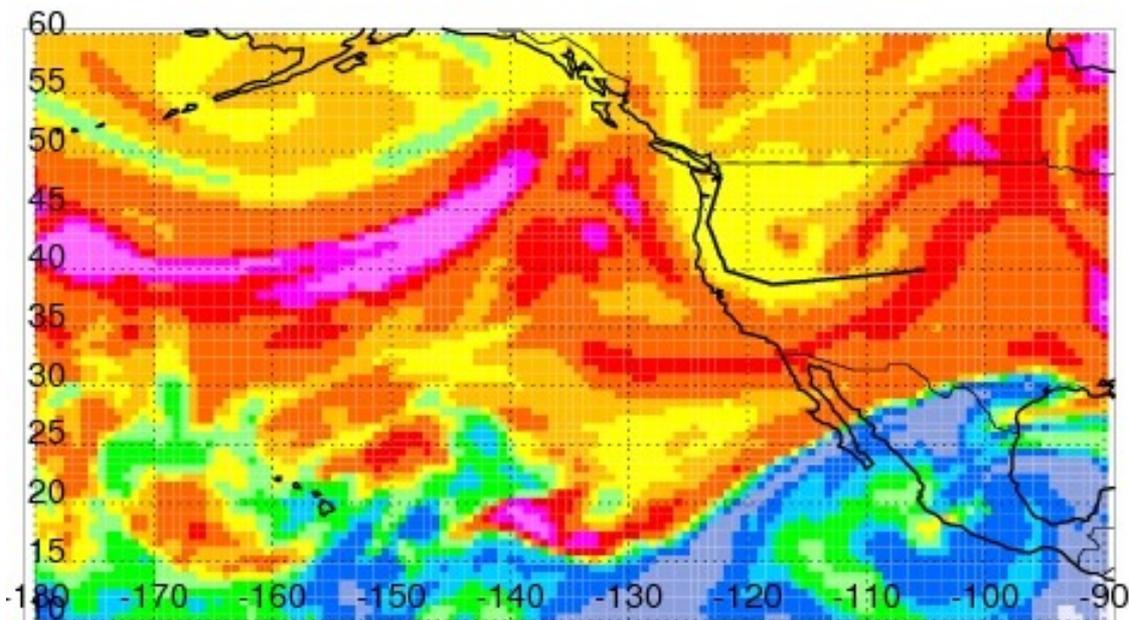


MOZART CO

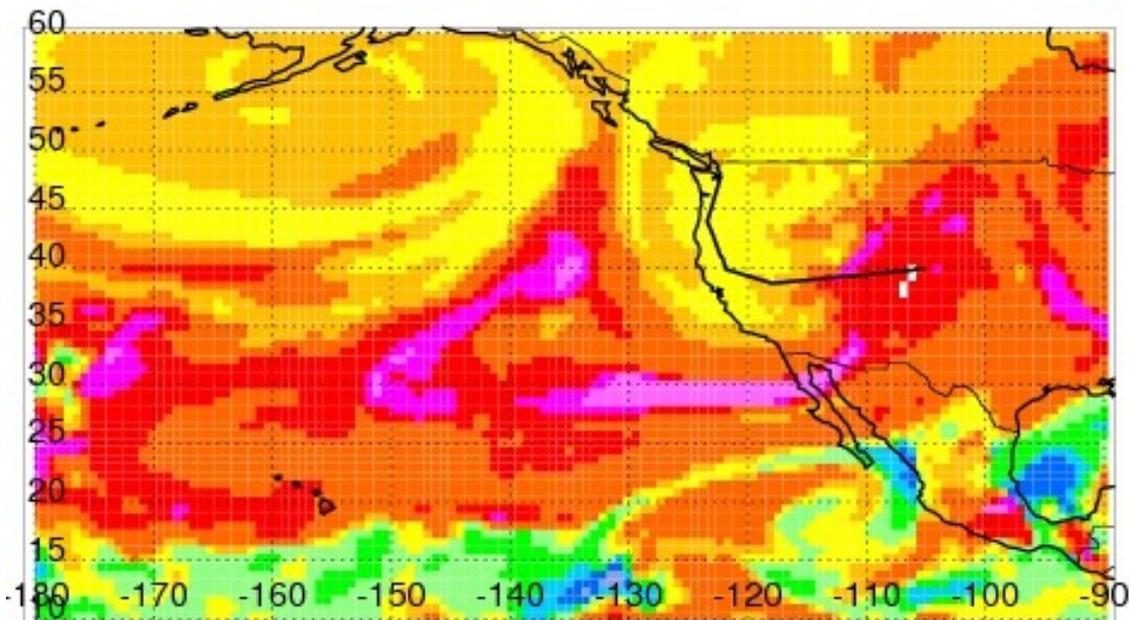
C130 may encounter very aged Asian plume at start of flight

Most of flight seems to be cleaner Canadian air

MOZART forecast CO: 20060417:18Z 500hPa



MOZART forecast CO: 20060417:18Z 700hPa

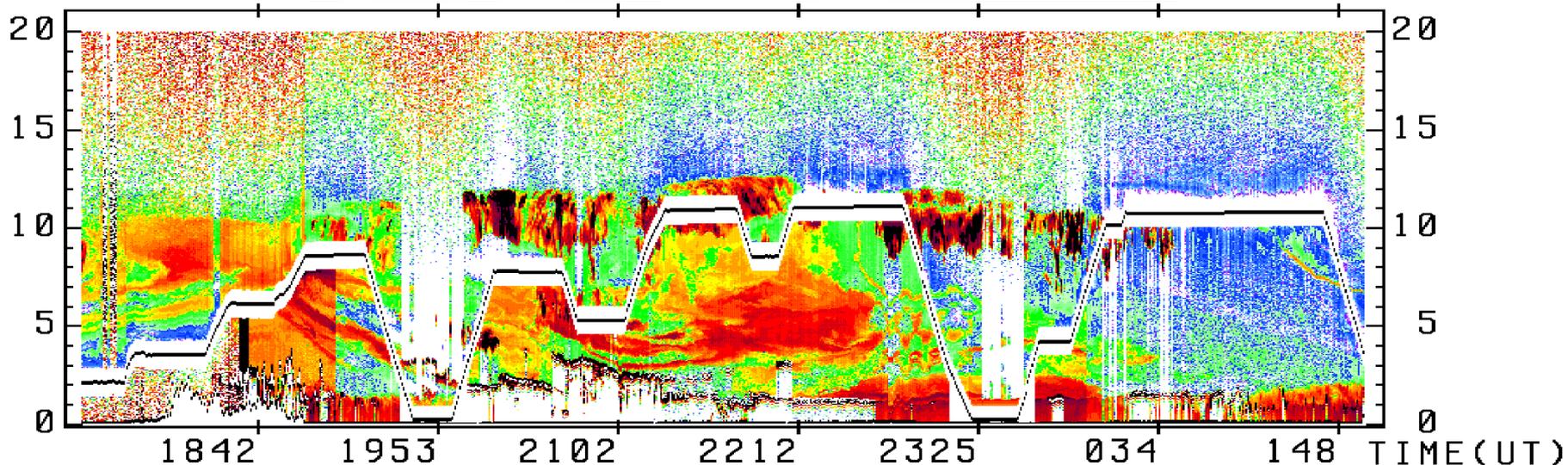


INTEX-B
Flight 10

Ames to Honolulu / C130 Intercomparison
Aerosol Scattering Ratio (10⁶4)

4-17-06

0.01 0.10 1 10 50



Ozone Mixing Ratio (ppbv)

0 20 40 60 80 100

