

INTEX-B: Flight 11 (Hawaii Local 1; April 23, 2006; Sunday)

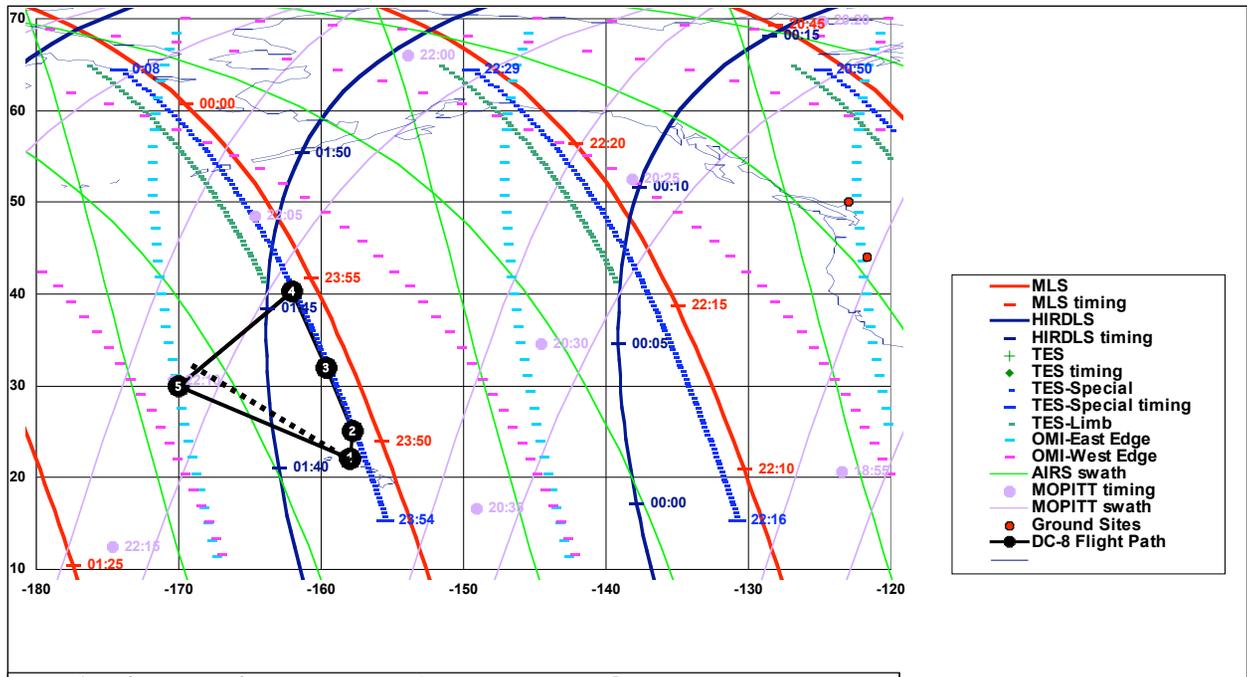
This was the 9th INTEX-B science flight and the first local Flight from Hawaii. The principal DC-8 objectives for this flight were sampling of aged and fresh Asian pollution over the Pacific and validation of TES and OMI observations. The nominal flight tracks and profiles for the DC-8 are shown in slides 2 below but these were modified in-flight to avoid significant cloud bands and to achieve timed coincidence with the TES overpass. The dotted line on north of the planned return leg shows the actual flight path taken to avoid a cloudiness. The major pollution features expected along the flight paths are shown in slides 3-4. Takeoff time for the DC-8 was 11:50 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 favorable for achieving stated objectives. High pressure dominated the south central North Pacific at the low and middle levels. Two low pressure systems influenced cloud conditions during the flight. As the DC-8 headed north, we first experienced extensive low clouds, but the cirrus was confined to only the northern most portion of the flight. The second system was an upper tropospheric trough whose north-south axis was near the Date Line. Clouds with this system stretched in a relatively narrow line from northwest to southeast along the final flight leg back to Honolulu. This planned leg was modified in flight to avoid as much of this cloudiness as possible. The polar jet stream was located well north of the flight track, near 50 N. Winds in the middle and upper troposphere generally had a strong westerly component. Low level winds were northeasterly below approximately 8,000 ft (the trade winds). The TES portion of the flight track generally had few clouds and the TES spiral location was virtually cloud free. No deep convection was observed any time during the flight

This was an excellent flight and we were able to meet all our objectives. We climbed out of Hickam to 34 Kft in the north easterly direction encountering significant pollution in the middle and upper troposphere (max O_3 -70 ppb). Descending to the surface we again sampled middle and upper tropospheric pollution arriving under the TES track. Lower troposphere also contained pollution with substantial concentrations of SO_2 (200 ppt), SO_4 (500 ppt), and other secondary organics such as PANs (300 ppt) and there were indications of dust at 5-10 Kft. Air mass composition and trajectories seemed to suggest urban Chinese pollution influences. After sampling the boundary layer we spiraled up at point 3 under the TES overpass time (2345 UT) and climbed to 37 K ft providing a complete column description under nearly cloud free conditions. The TES spiral also encountered significant vertical structure with pollution throughout the troposphere and some embedded clean tropical air in the 10-13 Kft region. During the TES spiral CO mixing ratios varied between 100-160 ppb and O_3 ranged from 30-75 ppb providing excellent dynamic range for TES validation. NO_x and HCHO mixing ratios were moderately low and may be near the detection limits of OMI. After completion of the TES spiral we profiled the troposphere along the TES track heading in the northerly direction. At the northerly point we encountered significant pollution in the upper troposphere where CO and O_3 levels exceeded 250 ppb and 100 ppb respectively. Pollution here was typically of an anthropogenic character and contained substantial concentrations of PAN (300 ppt) and SO_4 (200 ppt) with CO_2 enhanced by 0.5%. NO_x , H_2O_2 , HNO_3 and HCHO levels were still quite low (20-100 ppt). After arriving at the northerly point we headed in the southwesterly direction sampling and profiling the troposphere. Along this leg, a large blob of pollution was present in the middle and upper troposphere (see slide 5). Forward trajectory analysis suggests that this air may be sampled by the C-130 near Seattle in 2-3 days. The DC-8 turned towards Honolulu north of point 5 to avoid a large bands of clouds. Profiling the atmosphere, the DC-8 once again encountered large scale middle and upper tropospheric pollution with thinner layers of pollution at the lowest levels. Substantial concentrations of H_2O_2 and HCHO were measured in the boundary layer but NO_x was almost always very low (<100 ppt). Indications of dust were seen between 6-12 Kft throughout this flight.

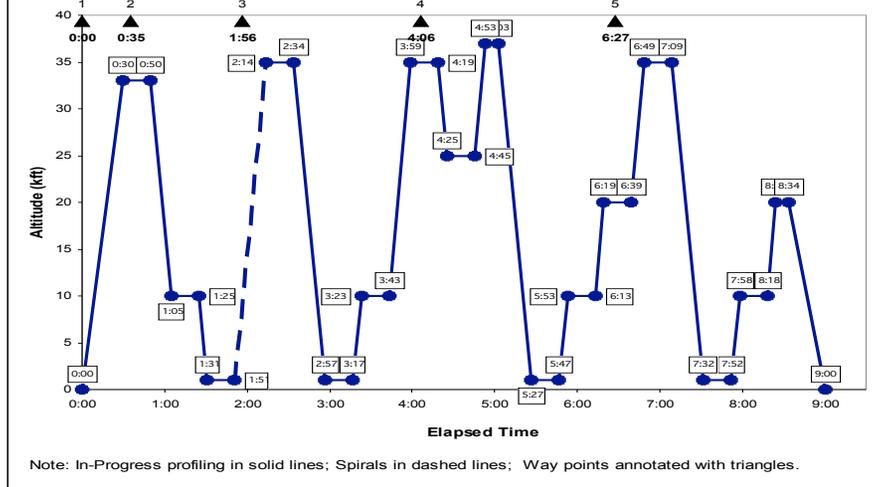
ICATS archived data files for INTEX-B are available at: <http://www.nasa.gov/centers/dryden/research/AirSci/DC-8/ICATS/FY06/INTEX-B/index.html>

INTEX-B Flight 11 (Hi-Local 1) April 23, 2006 (Sunday)



**T. O time:
1150 (LT)**

**Flt time:
9 hrs**



**- TES/OMI validation
- Fresh and aged Asian
pollution sampling at
multiple altitudes**

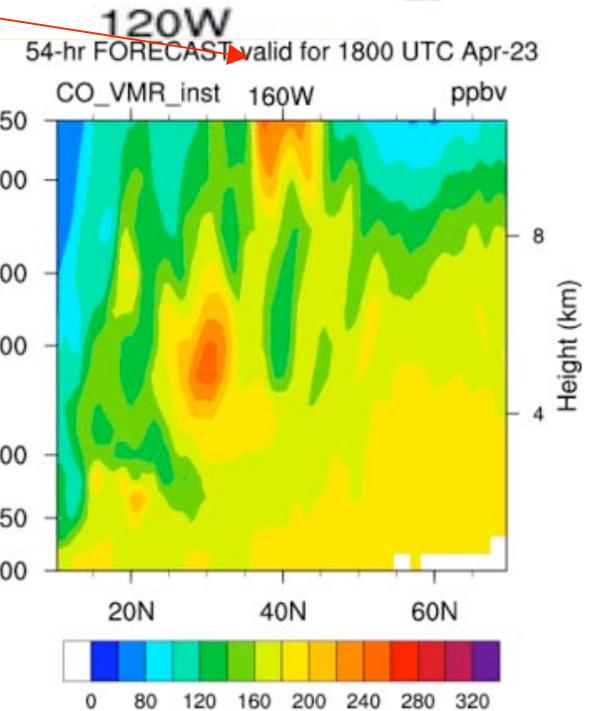
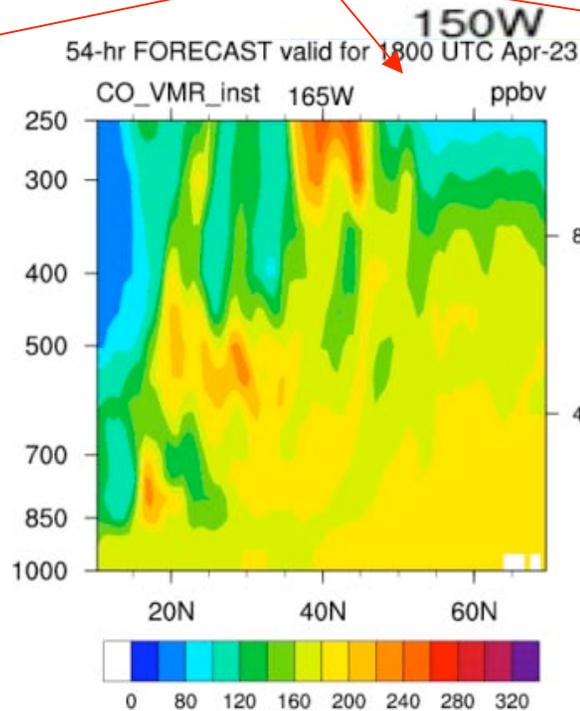
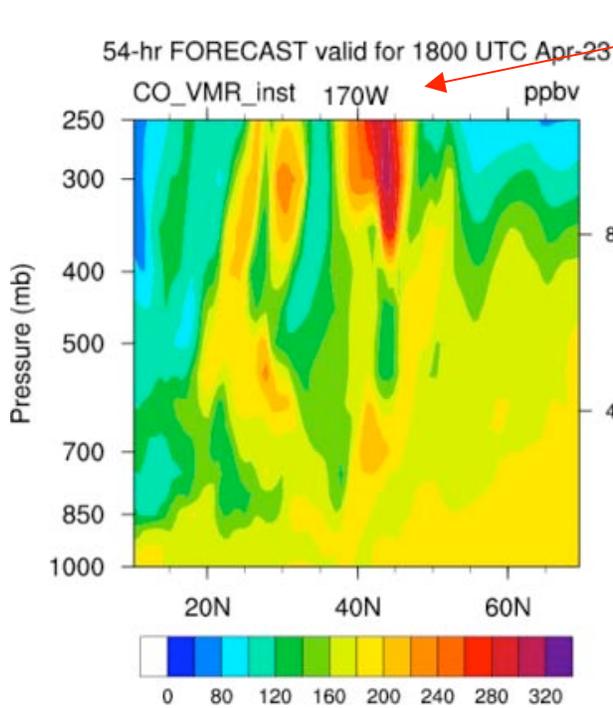
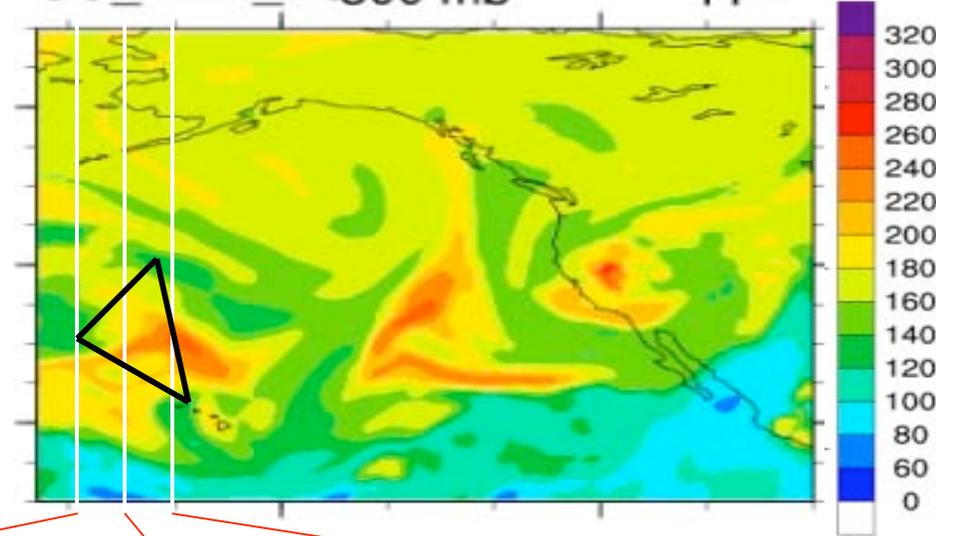


MOPITT/MOZART CO Forecast

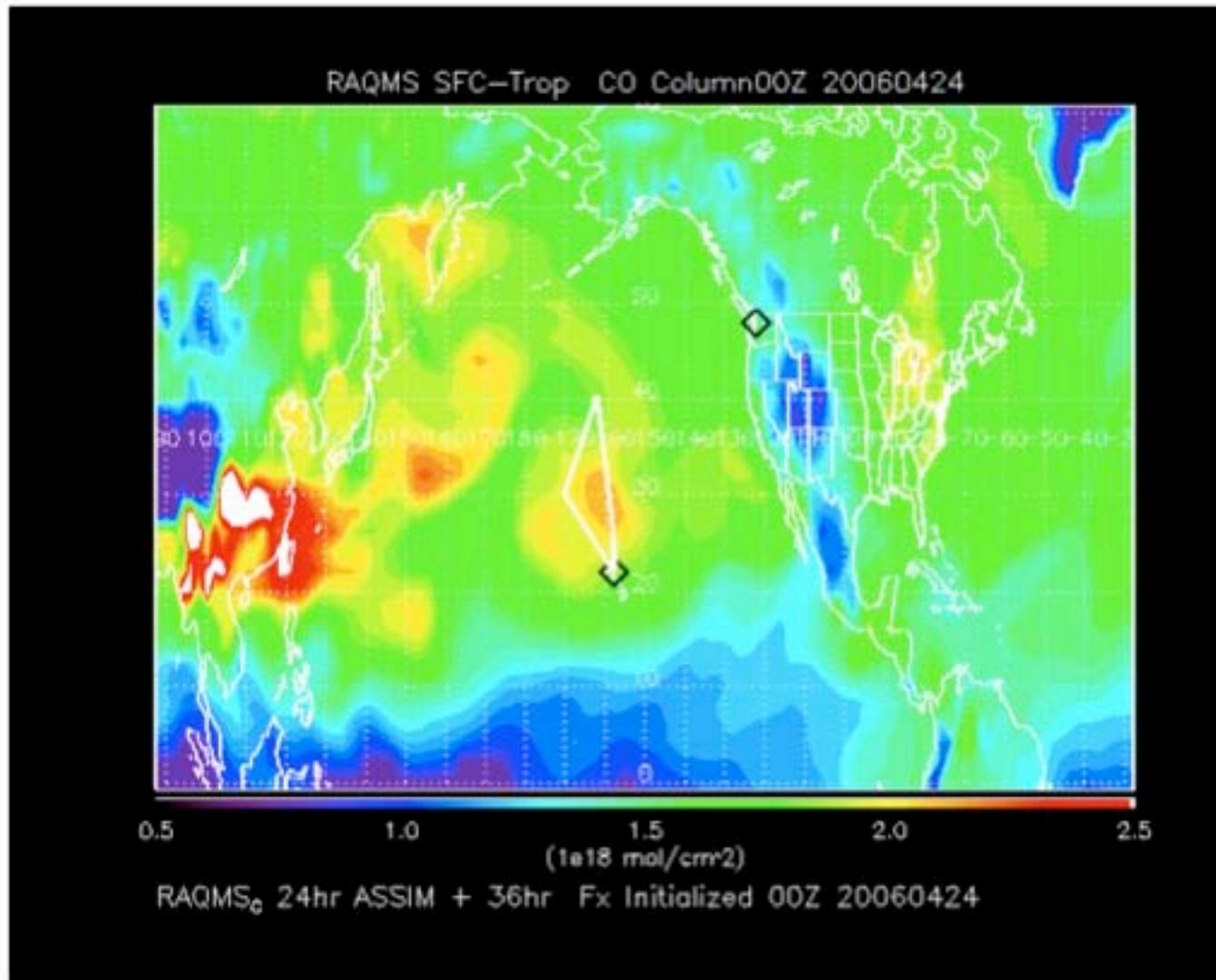


- Vertical slices show 2 plumes over HI and to the west at different altitudes

FORECAST valid for 1800 UTC Apr-23
CO_VMR_inst 500 mb ppbv



RAQMS Column CO 36hr Fx valid 00Z 04/24 (2PM Sun. 04/23 Hawaii local)

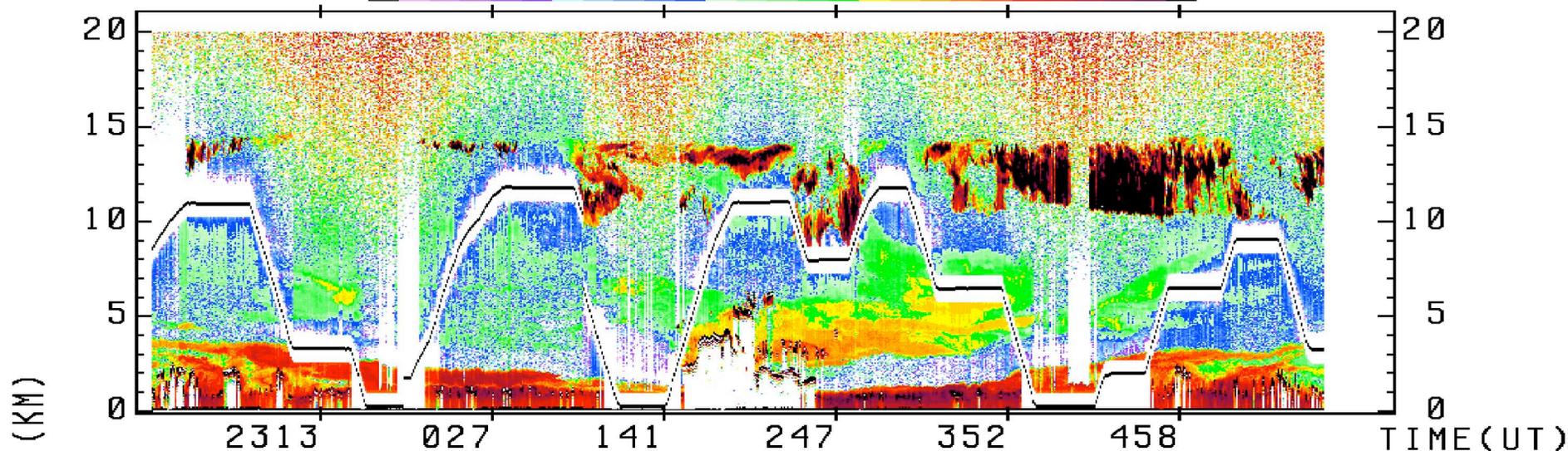
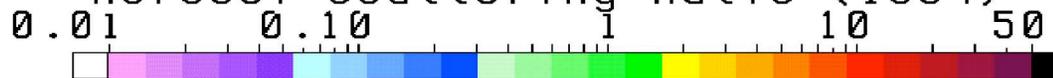


INTEX-B
Flight 11

Aged Asian Pollution

4-23-06

Aerosol Scattering Ratio (10⁶)



Ozone Mixing Ratio (ppbv)

