

## **INTEX-B: Flight 17 (AK local 3; May 9, 2006; Tuesday)**

This was the 14th INTEX-B science flight and the second local flight from Anchorage, Alaska. The principal aim of this flight was to provide validation for TES along its limb and nadir tracks, and vertical profiling through Asian plumes. The nominal flight track for the DC-8 are shown in slide 2 but this was somewhat modified to avoid significant clouds. Takeoff time for the DC-8 was 1145 (AK-LT) and the flight duration was 8.5 hours.

Most of the instruments aboard the DC-8 performed normally throughout the flight. The surface chart was dominated by a weakening low pressure center over the Gulf of Alaska. A frontal system and associated cloud band extended from the low to along the coast of British Columbia and then southwest over the eastern Pacific. The DC-8's farthest point reached the southwest edge of this front. Flow in the middle troposphere also was dominated by the low pressure, with easterly flow near Anchorage, southerly flow in middle flight segments, and westerly flow along southern portions of the flight. The DC-8 crossed the polar jet stream at about 45N and encountered westerly winds as strong as 105 kt. The DC-8 entered the stratosphere on several occasions and detected mixed stratospheric air at much lower levels. The tropopause was relatively close to the surface over the northern half of the flight track near the low pressure center. The DC-8 flew through several cloud features--the extensive clouds near Anchorage, the relatively clear slot of descending air behind the cold front, and the cloudy frontal region at the southern part of the track.

This was a successful flight and we were able to meet all our main objectives. The DC-8 climbed out of Anchorage in the northeasterly direction profiling and sampling the atmosphere to the TES-limb track point. Moderate levels of pollution were seen in the middle troposphere (CO-175 ppb). The DC-8 ascended to 29 kft (maximum allowed by ATC) at the TES-limb track and headed in the south easterly direction sampling and profiling air both in the stratosphere and the troposphere (slide 3). In the early portion of the TES-limb track the DC-8 was largely in the lowermost stratosphere (CO-70 ppb; O<sub>3</sub>-200 to 350 ppb) with HNO<sub>3</sub> concentrations in the 0.5-1.2 ppb levels. Descent to 15 Kft indicated presence of dust and some pollution (CO-160; O<sub>3</sub>-75; PANs- 200 ppt) with 100-200 ppt HNO<sub>3</sub> levels. Subsequently we climbed back up to 29 Kft sampling the air in the lowermost stratosphere with HNO<sub>3</sub> mixing ratios in the vicinity of 0.6 ppb decreasing slowly as we headed south. Overall conditions along this flight track were excellent with little to no visible cirrus except at the very southern end. The presence of tropopause folds was noted on the DIAL images (slide 3). This provided excellent conditions for TES-limb validation and a substantial dynamic range in mixing ratios of HNO<sub>3</sub>, CO, O<sub>3</sub>. After completing the TES-limb validation we headed east under the TES nadir track and spiraled down from 35 to 0.5 Kft. The spiral point was almost free of cirrus clouds with low overcast with tops of 2-3 km. There were indications of pollution both in the upper (30-35 Kft) and the middle (15-20 Kft) troposphere as suggested by some of the models. Both pollution and dust layers were encountered with CO exceeding 200 ppb and SO<sub>2</sub> and SO<sub>4</sub> mixing ratios of 0.4 and 0.6 ppb respectively. On the return track heading west and north we profiled the troposphere under occasional cloudy conditions with continual presence of dust layers indicated by high depolarization and total scattering as well as pollution in the middle troposphere. The dust layers were the most extensive observed so far in this mission and were sampled in great detail.

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



INTEX-B  
Flight 17

Alaska Local 3: TES Limb & TES Nadir  
Aerosol Scattering Ratio (1064)

05- 9-06

