

C-130 IMPEX / INTEX-B Flight summary

date: 21 April 2006 (20060421)

flight number: 2

Take-off: 17:04:50 GMT

Landing: 00:48:33 GMT

Objectives:

- sample Asian outflow plumes off the US coast
- learn the models' predictive capabilities for Asian plumes
- perform aircraft maneuvers requested by EOL personnel

Instrument status:

Most instruments performed for at least part of the flight. Most of the instruments that make measurements of the chemical and particle content of the plumes generally worked well. However, some critical chemical and particle instruments did not operate, making a photochemical analysis of these plumes difficult. SABL was not operational.

Flight summary.

Dark pollution layers were visible as soon as the C-130 ascended through the clouds and headed out over the Pacific Ocean. They were best observed by looking through them horizontally, but could be seen as haze below the C130 and on rare occasions as a slight change in the sky's color above. The layers appeared to be more distinct at the beginning of the flight and became embedded in a haze layer at the southernmost point at 38° N. Toward the northern end of the track over the Pacific (near 45° N), the plume layers seemed to be less intense and less frequent. Above ~6 km, the air was quite clean.

The meteorology indicates that these plumes were from Asia. Chemical analysis will be used to confirm this indication. The CO in the plumes was enhanced above the background CO in the surrounding air by 20-60 ppbv and occasionally more than 100 ppbv. PAN, NO_y, other hydrocarbon tracers, and particles were also observed to be enhanced in the plumes as well. Dust layers were also sampled.

Just above the fair weather cumulus over the ocean was a dry layer containing enhanced sulfur species. This layer was observed on most ascents and descents to 1500 feet.

The flight strategy was to do in-transit vertical profiles and to go back to altitudes where plumes had been observed. This strategy was generally not successful. As has been observed before, the size and shape of the plumes varied greatly. Both thick (~kilometer) and thin (~100 m) plumes were sampled on at least a few vertical ascents and descents along the flight track, indicating a large horizontal extent in the direction of travel. Other plumes were no wider than ~50 km.

All objectives were met, although a more operational payload will be needed for a more complete characterization of the pollution layers and their chemical transformations.