



VOCs in Local Plumes and Asian Outflow During IMPEX



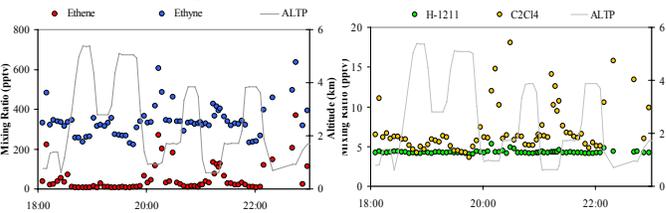
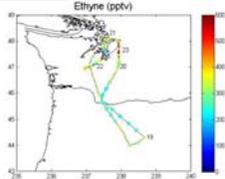
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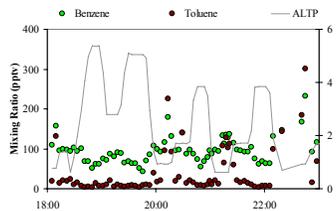
Local (U.S.) Pollution

Flight 3: Seattle

- 24 April 2006, from Seattle
- Take off 17:59 UTC (09:59 local)
- 7.5 hours, 71 samples
- Elevated anthropogenic species (including short-lived NMHC).

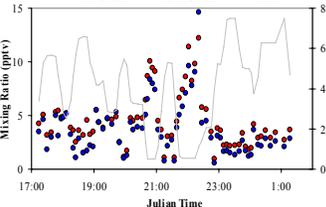
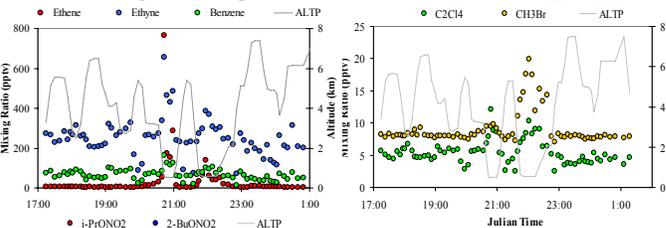
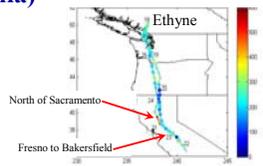


- High toluene, ethene (short-lived; indicates recent/local emissions)
- Elevated C_2Cl_4 – urban tracer
- Low/no H-1211 elevation: limited use in U.S.



Flight 7: Central Valley (California)

- 3 May 2006, from Seattle
- Take off 17:05 UTC (09:05 local)
- 7.5 hours, 71 samples, 2 C.V. legs
- Urban and agricultural pollution



- Higher urban tracers (ethene, ethyne, C_2Cl_4) on northern run
 - More recent, urban emissions
- ↑ Alkyl nitrates Fresno – Bakersfield
 - Transport from urban areas?
- Elevated CH_3Br Fresno – Bakersfield
 - agricultural uses, banned!

Introduction

As part of IMPEX during the second phase of INTEX-B (Intercontinental Chemical Transport Experiment) we collected whole air canister samples aboard the NCAR C-130. A primary focus of INTEX-B/IMPEX was to characterize and quantify the transport and evolution of atmospheric pollutants to North America from Asian. The C-130 aircraft was based out of Seattle, WA and as such we were also afforded the opportunity to study local North American pollution, primarily Seattle urban outflow and pollutants in California's Central Valley.

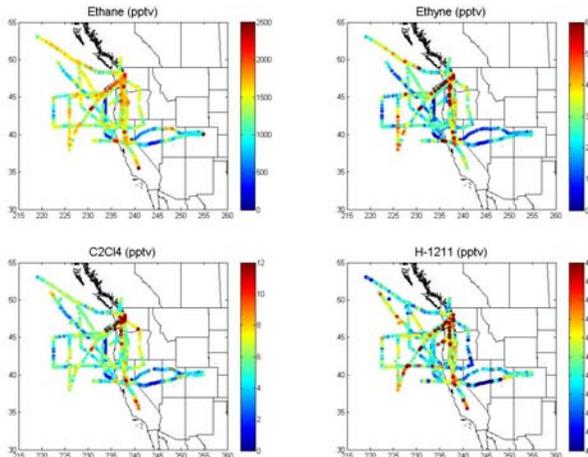
Methods

- Flights between 17 April and 15 May 2006
 - 12 flights total; 2 transit and 10 local
- 854 whole air canister samples collected aboard the C-130
 - 2-L stainless steel sampling canisters
 - Pressurized to 40 psig over ~1 minute
 - Samples collected every 6 minutes (avg)
- Analyzed with GC + 6 column/detector combinations:
 - 3 FIDs for nonmethane hydrocarbons
 - 2 ECDS for halocarbons, alkyl nitrates and sulfur species
 - 1 MSD for selective ion detection



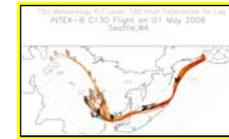
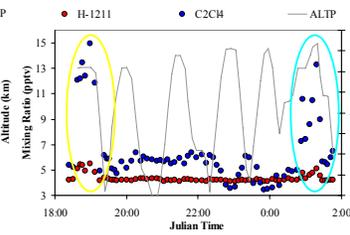
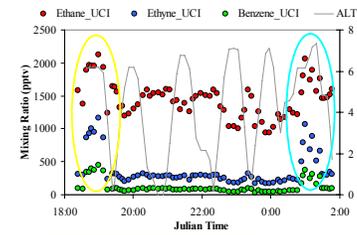
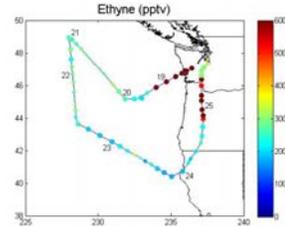
Overview

- Saw evidence for Asian outflow and also local emissions
- H-1211 as a marker for Asian outflow
- Ethyne and C_2Cl_4 as urban tracers



Flight 6

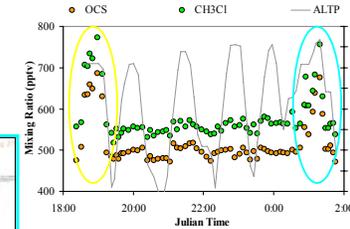
- 1 May 2006, from Seattle
- Take off 18:15 UTC (10:15 local)
- 7.5 hours, 71 samples
- High altitude (>20 Kft) Asian plume near coast
 - Enhancements in anthropogenic/Asian tracers



3 to 4 days old



5+ days old



(Back trajectories from Fuelberg *et al.*, FSU)

Acknowledgements

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