INTEX - NA
Meteorological Overview

Henry Fuelberg
Chris Kiley
Danielle Morse
Michael Porter

Dept. of Meteorology
Outline

- Describe meteorological conditions during INTEX
- Assess representativeness of INTEX period
- Examine interesting scenarios
  - Extensive lightning
  - Asian pollution
    -- Alaskan fires
    -- Transport to Europe (Lagrangian experiment)
Surface Pressure

2004 46-day Mean

Climatology
Animation of Sea Level Pressure

July 1-6 – California flights
July 7-15 – Mid America I flights
July 16-Aug 11 – Pease flights
  Pause July 28 – North Atlantic flight
  Pause July 31 – Bermuda high flight
August 12-15 – Mid America II flights
  and return to Dryden
Surface Pressure - CA

SEA LEVEL PRESSURE (mb) 01-DAY MEAN FOR:
Thu JUL 01 2004

NCEP OPERATIONAL DATASET
Surface Pressure - NH

Pease

SEA LEVEL PRESSURE (mb) 10-DAY MEAN FOR:
Fri Jul 16 2004
NCEP OPERATIONAL DATASET
Contrasting Weather Patterns

Strongest High – Aug 7 00Z

Deepest Low – Aug 10 12Z
Lightning Composite
Entire INTEX Period
A frontal passage can produce much convection, whereas a high pressure area can suppress convection.

<table>
<thead>
<tr>
<th>July</th>
<th>Number of Fronts Passing NE US</th>
<th>Average Time Between Fronts</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>3</td>
<td>7 days</td>
</tr>
<tr>
<td>2001</td>
<td>4</td>
<td>8 days</td>
</tr>
<tr>
<td>2002</td>
<td>6</td>
<td>5.2 days</td>
</tr>
<tr>
<td>2003</td>
<td>6</td>
<td>3.8 days</td>
</tr>
<tr>
<td>2004</td>
<td>5</td>
<td>5.3 days</td>
</tr>
</tbody>
</table>
Days With Closed High Affecting Northeast During INTEX Period

- 2000: 13 days
- 2001: 14 days
- 2002: 14 days
- 2003: 8 days
- 2004: 10 days

No stagnant highs over northeast!
500 mb Heights - STL

500mb GEOPOTENTIAL HEIGHTS (dam)  01-DAY MEAN FOR:
Thu AUG 12 2004
NCEP OPERATIONAL DATASET
2004 vs 2003 & 2002
500 mb

2003

2004

2002
Strong Alaskan Ridge

Jul 1 – Aug 15 2004

Anomaly
300 mb Winds

2004 46-day Mean

Climatology
300 mb Winds - CA

300mb WINDS (m/s) 01-DAY MEAN FOR: Thu JUL 01 2004
NCEP OPERATIONAL DATASET
300 mb Winds - STL

St Louis

300mb WINDS (m/s) 01-DAY MEAN FOR:
Wed JUL 07 2004
NCEP OPERATIONAL DATASET
300 mb Winds - NH
300 mb Winds - STL

St Louis

300mb WINDS (m/s) 01-DAY MEAN FOR:
Thu AUG 12 2004
NCEP OPERATIONAL DATASET
700 mb Winds

2004 46-day Mean

Climatology
Case Studies

- Lightning
- Asian Pollution
- Alaskan Fires
- Flow to Europe (Lagrangian Experiments)
Lightning Composite
Entire INTEX Period
July 12 Flight

Lightning from 0708-0712
Asian Pollution – August 2
Note flight legs
300 mb Winds July 24 – Aug. 2

2004

Climatology
Back Trajectories from Aug. 2
Alaskan Fires

Jul 8  Jul 10  Jul 12

Jul 14  Jul 16  Jul 18—See next
Alaskan Fires

PATH FOR INTEX-NA FLIGHT ON 18 JUL 2004

INTEX-NA 1-MINUTE TRAJECTORIES - FSU METEOROLOGY
10 DAYS BACK FROM FLIGHT ON 18 JUL 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 11

10 DAYS BACK FROM FLIGHT ON 18 JUL 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 20

10 DAYS BACK FROM FLIGHT ON 18 JUL 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 27
Lagrangian to Europe--300 mb Winds

2004 46-day Mean

Climatology
Lagrangian to Europe
300 mb Winds

300mb WINDS (m/s) 01-DAY MEAN FOR:
Thu JUL 01 2004
NCEP OPERATIONAL DATASET
Lagrangian Case Forward Trajectories
850 mb Winds

2004 46-day Mean

Climatology

Dept. of Meteorology
850 mb Winds

2004 46-day Mean

Climatology
Conclusions

- INTEX-A mostly representative of climatology
- But, a persistent trof along the East Coast
- Frontal passages on the “high” end of normal
- No stagnant high pressure centers over NE
- Hot and dry over Alaska ➔ record fires
- TransPacific flow sometimes conducive to long range transport to central/eastern U.S.
- TransAtlantic sometimes conducive to European transport, but farther south than usual
Our Goal is to Assist You

Our web site contains met. data about each flight, e.g., trajectories, flow patterns, etc. We are happy to help you apply meteorology to your own research. If we do not have the product you need, we will make it for you. Just let us know!!