Questions for consideration

• Are sensitivity analyses enough to inform HTAP impacts on air quality goals? (or do we need total contribution?)

• How well do the global models simulate air quality? Vs. obs? Vs. regional models?

• What is spatial variation within the HTAP regions? Daily variability (peak values)? Interannual variability?

• How to quantify uncertainty?
Impacts on Air Quality Objectives:

Initial HTAP SR Results

and Next Steps

Arlene M. Fiore (arlene.fiore@noaa.gov)

TF HTAP Workshop, Washington, DC, June 12, 2008
Exceedances of EU air quality standard due to NA emissions

Li et al., JGR, 2002

What is the impact of 20% reductions on metrics used to gauge compliance with air quality standards?
Initial HTAP results:
Simulated vs. observed DAYS>60 over Europe

Model ensemble mean reasonable;
Low bias at high-altitude sites consistent with evaluation for monthly mean results.

Fiore et al., in prep
Change in DAYS>60 when all O$_3$ precursors are reduced by 20% in foreign regions

Fiore et al., in prep
Model ensemble mean decrease in DAYS>60 over Europe when NA O₃ precursor emission are decreased by 20% (SR1-SR6NA)
Enhancements from Asian/European pollution over the U.S. in summer as determined from a simulation without these emissions (GEOS-Chem 4 x5)

Max Asian/European pollution enhancements (up to 14 ppbv) occur at intermediate ozone levels (50-70 ppbv)

→ Major concern if national ozone standard were to decrease

Fiore et al., JGR, 2002
Maximum intercontinental influence occurs near the center of the overall $O_3$ distribution.

Impact of a 20% decrease in NA anthrop. NO$_x$ to EA surface $O_3$ (Jun 1 - Aug 31 2001)

- Mean of 10 ppb bins
- Each point is 1 daily max 8-hr avg surface $O_3$ in 1 model grid cell

**MOZART-2 model at GFDL**

$\rightarrow$ Is this result robust across the HTAP models?
$\rightarrow$ Analysis planned for HTAP results for U.S.A.
Variability within the U.S.:
Asian+ European enhancement vs. total sfc.

Pacific Northwest

Midwest

Mid-Atlantic

Mountain West

Tracey Holloway, U Wisconsin-Madison

Consistency / spread across TF HTAP models?