

Climate Outcomes:

Assessing the Global/Regional Impacts of SLCF

Summary of Breakout Group Discussion
SLCF Workshop – 3/03/10

Summary of Climate Outcomes Breakout Session

Workshop on Short Lived Climate
Forcers

Chapel Hill, NC
March 3-4, 2010

Climate Outcomes: What do we know well?

- Health impacts of SLCF are important and immediate
 - Should be integral element of climate policy considerations
- Black carbon reductions would benefit both health and climate
 - Directionality is known even if magnitude is uncertain
 - Of the ways to improve PM air quality, reductions in black carbon are likely the best for climate
- Methane controls would also benefit both health and climate
 - Health benefits via longer-term reductions in ozone

Climate Outcomes:

What do we know well?

- O₃ precursor reductions would also benefit health and climate
 - Of the ways to improve ozone air quality, reducing methane, CO, VOCs (in that order) are likely best for climate
- Eventual strategies will need to consider health, climate, and other effects.
 - Need integrated management view

Climate Outcomes:

What are the areas of uncertainty?

- Quantifying radiative forcing attributable to aerosol indirect effects
- Transition from quantifying radiative forcing to quantifying climate impacts
 - e.g., SLCF impacts on precipitation, extreme events, ecosystems
 - Need for better metrics beyond RF_{glob} or T_{glob}
- Transition from quantifying global RF to regional RF (and climate impacts) from SLCF
 - Uncertainty in downscaling from global to regional/local scale
- Effects of aerosols on precipitation

Climate Outcomes:

What are the areas of uncertainty?

- Vertical distribution of BC can impact climate outcomes
 - Need evaluate model representations of vertical profiles
- BC role in clouds (indirect forcing)
- Model treatment of SLCF need continued improvements
 - Mixing state of aerosols / number distributions
 - Gas/aerosol interactions
 - Atmospheric processes
 - Improved model inputs (e.g., emissions)

Climate Outcomes:

Where is additional research needed?

- Need focus research on key uncertainties
 - e.g., aerosol indirect effect
- Need targeted observational analyses to detect signals from SLCF, validate climate models, and link the two
 - Need creative ways to observationally assess indirect effect
 - Studies of time trends to test model sensitivity
- Research natural experiments
 - Recent U.S. diesel reductions, low sulfur fuels
 - Trends in dimming / brightening

Climate Outcomes:

Where is additional research needed?

- Develop tools to assess comparative mortality
 - climate vs. air
 - different actions to address climate
- Better identification of model strengths – what processes are captured and which are most important for capturing climate signal
- Need modeling that matches likely policies
 - e.g., 50% sector reductions vs. zero-out BC/CH₄/O₃
- Move from quantifying RF/climate effects:
 - Abundance-based -> Emissions-based -> sources -> actions