

5.122 International air quality and climate impacts of emissions control strategies.

Presenting Author:

Daven Henze, University of Colorado Boulder, daven.henze@colorado.edu

Co-Authors:

Forrest Lacey, University of Colorado Boulder

Yanko Davila, University of Colorado Boulder

Aaron van Donkelaar, Dalhousie University

Randall Martin, Dalhousie University

Abstract:

National-scale source-receptor relationships are developed to evaluate the domestic and international contributions to $PM_{2.5}$ and O_3 , and their impacts on human health and climate. These relationships are developed using adjoint sensitivity analysis, constraints from remote sensing observations, and parameterized climate model sensitivities, and they are evaluated in comparison to results from multi-model simulations. We use these relationships to examine impacts of emissions control strategies such as vehicle emission standards and cookstove interventions. Impacts are assessed in terms of premature deaths associated with exposure to $PM_{2.5}$ and O_3 , damages to crops and ecosystems from ozone and nitrogen deposition, and perturbations to global mean surface temperature. In each case, we examine scenarios where the roles of atmospheric chemistry and transport lead to disparities in the per-emission impact of various sources. These topics are presented in the context of developing integrated assessment tools for decision support activities at national and international scales.