

Estimating fire emissions and the impacts for air quality in the eastern U.S.

Christine Wiedinmyer, Angie Belote, Brad Quayle, Chris Geron, Alex Guenther, and Carol Shay

The emissions of aerosol and trace gases from fires can have an impact on local and regional air quality and visibility, particularly in the eastern U.S. Understanding these emissions and including these processes in regional air quality model simulations is essential for evaluating air pollution and visibility deterioration, and for creating effective policies to reduce such problems. This paper presents a simple new modeling approach that can be used to estimate the emissions from fires at high spatial (1 km²) and temporal (daily to hourly) for January 2002 to the present day. This model framework utilizes existing, publicly-available data, including satellite data, such as the MODIS Thermal Anomalies product. Emissions estimates from fires in all of North America are included in the emissions inventory, since fires in Canada and Central America often impact air quality in the United States. For example, fire emissions from Canada have impacted air quality and public health along the eastern seaboard on more than on occasion in the past few years. The output from this model enables regional chemical transport modelers to easily include relevant fire emissions into their model simulations and to determine if those emissions impact the predicted air quality and visibility. Regional air quality impacts of those emissions are evaluated with the Community Multiscale Air Quality Model (CMAQ). The emissions inventories and simulated air quality can be assessed using data from existing monitoring networks (i.e., IMPROVE, STN). The implications of the emissions on the model simulations, and further, on potential policy decisions guided by model results, will be addressed. Future model developments and community needs for better emission inventory development include improved fuel inputs such as fuel loads and fuel moisture.