Deterministic & Empirical Assessment of Smoke's Contribution to Ozone ($DEASCO_3$) Project

http://www.wrapfets.org/deasco3.cfm

The Deterministic and Empirical Assessment of Smoke's Contribution to Ozone ($DEASCO_3$) project is a study funded by the Joint Fire Sciences Program (JFSP) to produce analytical results and a dynamic and accessible technical tool that enables Federal Land Managers (FLMs) to participate more fully in ozone and PM air quality planning efforts. A set of hypotheses, developed for the study proposal, guide the analyses and the data presentation for the technical tool:

Technical Hypotheses

Ho1 – Mature and well-mixed smoke emissions from wildland fire do not titrate ambient ozone, but do contribute to increased downwind formation of ambient ozone and, therefore, elevate background concentrations of ozone across a large geographic area of the U.S.

Ho2 – A number of wildland fire variables assessed and managed by operational fire managers in planning and executing individual fires (e.g., fuel loading, fire size, timing and length of fires) affect formation of ozone.

Ho3 – Cumulative emissions from groupings of proximate and coincident managed wildland fires over multi-day periods cause or contribute to exceedances of the level of the primary ozone NAAQS.

Policy Hypotheses

Ho4 – Improved quantitative information about fire emissions' contribution to ambient ozone levels will allow fire managers to demonstrate the change in air quality resulting from smoke management programs (e.g., individual fire management methods, cumulative fires, emissions reduction techniques), and more effectively participate in air quality planning efforts to address ozone nonattainment areas.

Ho5 – Improved quantitative information will increase FLMs' understanding of spatial and temporal variation in fire emissions' contribution to elevated ambient ozone events and accommodate more effective and timely involvement of FLMs in air quality planning processes.

To evaluate these hypotheses, a set of roughly 20 Case Studies will be developed to characterize the relationship of emissions from fire to ozone across a broad range of circumstances including geographic locations, fuel conditions, time of year, fire types, and contributions to elevated background levels and levels in excess of various existing and potential ozone NAAQS. The suite of Case Studies will be designed to characterize situations analogous to those that FLMs may face with current conditions and in the future. The project will also develop and publish new fire emissions inventories and computational modules for chemical transport models to simulate the atmospheric transformations of these emissions, which will inform each Case Study analysis and produce a rank-order list of most-impacted areas in the CONUS for ozone.

The technical tool will be a Web-based, dynamic environment that will present the results of the Case Study analyses and allow users to access and use the same set of modeling, fire emissions, observed ozone, and other data products to create new analyses for past and future scenarios. Three analysis pathways, for Exceptional Events, Fire Planning, and SIP Planning, will guide users to sets of tools and data, and relevant Case Studies to jump-start new investigations.

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