

SEAN M. RAFFUSE

Project Manager
Fire Sciences Program Coordinator
Senior Air Quality Analyst



Educational Background

M.S., Environmental Engineering, Washington University
B.S., Chemical Engineering, Washington University
B.A., Chemistry, Lewis & Clark College

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Professional Experience

Mr. Raffuse joined STI in 2003. He coordinates STI's Fire Sciences Program. His efforts focus on developing and improving fire and smoke models through the use of new data sets, research, and information systems, and developing and using satellite-derived data products.

Mr. Raffuse is a collaborator on the BlueSky smoke modeling framework, developed jointly by the USDA Forest Service and STI. He designed the algorithms for the SMARTFIRE tool. SMARTFIRE combines satellite-detected fire information and ground-based fire reports and reconciles them into a unified data set for input to BlueSky. Mr. Raffuse used SMARTFIRE and BlueSky to produce wildfire emission inventories (including greenhouse gases) for the U.S. Environmental Protection Agency (EPA). He is currently leading an effort to improve the SMARTFIRE reconciliation algorithms and expand the number of data sets it can ingest. Mr. Raffuse used CALIPSO aerosol vertical profiles and MISR plume height retrievals to validate the BlueSky plume injection height algorithms. Mr. Raffuse has also used Moderate Resolution Imaging Spectroradiometer (MODIS) aerosol optical depth and other satellite-derived data sets to validate the BlueSky model output.

Mr. Raffuse coordinates several software and systems projects in fire science applications: development of a service-based version of the BlueSky framework and an accompanying web visualization system; re-architecture of the Fuels Characterization and Classification System; and design of an Interagency Fuels Treatment Decision Support System (IFTDSS) for forest managers. Mr. Raffuse led the development of the BlueSky Playground, a web-based tool for modeling smoke from fires.

As an air quality analyst, Mr. Raffuse focuses on creating and applying geospatial analysis techniques, developing web-based and desktop geographic information system (GIS) tools, and discovering ways to apply satellite data to air quality applications. Mr. Raffuse is the Co-Principal Investigator on a project to study the potential for smoke from prescribed fires in the United States to transport to the Arctic. Mr. Raffuse is working with others at STI to develop a high-resolution aerosol optical depth product suitable for use in air quality and exposure applications.

Mr. Raffuse has been involved in the design and development of several analytical software tools, including the Probability of Regional Source Contribution of Haze (PORSCH) suite, which couples air mass backward trajectories with emission inventory data to help determine the causes of regional haze; an algorithm for incorporating the influence of wind direction frequency into a model of exposure to pollutants from roadways; and the AIRNow-Tech Navigator, a web-based GIS tool that displays hourly pollutant, wildfire, and meteorological information collected from the EPA's AIRNow program in an interactive geographic context in near real time.

Before joining STI, as a graduate research assistant at the Center for Air Pollution Impact and Trend Analysis (CAPITA) at Washington University, Mr. Raffuse developed techniques to automatically retrieve and process daily surface reflectance data using satellite imagery from the SeaWiFS satellite.

Memberships

Air & Waste Management Association
Association of Fire Ecology
International Association of Wildland Fire
American Geophysical Union

See <http://www.sonomatech.com/ResPub/SMRpub.pdf> for a list of publications.