

## SEAN M. RAFFUSE

Project Manager/Fire Sciences Program Coordinator/  
Senior Air Quality Analyst

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### 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 and 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 U.S. Forest Service and STI. He designed the Satellite Mapping Automatic Reanalysis Tool for Fire Incident Reconciliation (SMARTFIRE) algorithms. 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 applied SMARTFIRE and BlueSky to produce a four-year wildfire emission inventory (including greenhouse gases) for the U.S. Environmental Protection Agency (EPA). 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 MODIS aerosol optical depth and other satellite-derived data sets to validate the BlueSky model output. In 2010, Mr. Raffuse and the BlueSky team will use satellite measurements of ground moisture to enhance the BlueSky system.

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 the design of an Interagency Fuels Treatment Decision Support System 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 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 authored several technical publications including a guidance document for EPA to assess air quality monitoring networks using statistical and geospatial techniques.

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

### Memberships

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

See STI's website, <http://www.sonomatech.com/resumes.htm>, for a list of publications.