

Global wildfire plume-rise dataset and parameterizations for climate model applications

www.nrfirescience.org/resource/22919

The fire plume height (smoke injection height) is an important parameter for calculating the transport and lifetime of smoke particles, which can significantly affect regional and global air quality and atmospheric radiation budget. To develop an observation-based global fire plume-rise dataset, a modified one-dimensional...

Author(s): Ziming Ke, Yuhang Wang, Yufei Zou, Yongjia Song, Yongqiang Liu

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Prescribed fires may mean safer smoke

www.nrfirescience.org/resource/22378

Inhaling wildfire smoke can be harmful, but smoke from unintended wildfires may be worse than smoke from prescribed burns, according to a study published in 2019. That means the health risks from wildfires — like the ones that have destroyed millions of acres and turned the sky blood orange this fall in California, Oregon and...

Author(s): Casey Crownhart

Year Published: 2020

Type: Document

Technical Report or White Paper

Peat burning - an important source of pyridines in the earth atmosphere

www.nrfirescience.org/resource/21494

Studies of the chemical composition of atmospheric aerosols, rain water and snow in various regions of the globe quite often show the presence of pyridine and a number of its low mass derivatives.

Nevertheless, the sources of those compounds in the environment have not yet been established and definitely require elucidation,...

Author(s): Dmitry S. Kosyakov, Nikolay V. Ul'yanovskii, Tomas B. Latkin, Sergey A. Pokryshkin, Valeria R. Berzhonskis, Olga V. Polyakova, Albert T. Lebedev

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Wildland fire emission factors in North America: synthesis of existing data, measurement needs and management applications

www.nrfirescience.org/resource/20774

Field and laboratory emission factors (EFs) of wildland fire emissions for 276 known air pollutants sampled across Canada and the US were compiled. An online database, the Smoke Emissions Repository Application (SERA), was created to enable analysis and summaries of existing EFs to be used in smoke management and emissions...

Author(s): Susan J. Prichard, Susan M. O'Neill, Paige C. Eagle, Anne Andreu, Brian Drye, Joel Dubowy, Shawn P. Urbanski, Tara Strand

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Using Digital Technology to Protect Health in Prolonged Poor Air Quality Episodes: A Case Study of the AirRater App during the Australian 2019–20 Fires

www.nrfirescience.org/resource/21612

In the southern hemisphere summer of 2019–20, Australia experienced its most severe bushfire season

on record. Smoke from fires affected 80% of the population, with large and prolonged exceedances of the Australian National Air Quality Standard for fine particulate matter (PM2.5) recorded in all major population centers. We...

Author(s): Sharon L. Campbell, Penelope J. Jones, Grant J. Williamson, Amanda J. Wheeler, Christopher Lucani, David M. J. S. Bowman, Fay H. Johnston

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Traffic exhaust to wildfires: PM2.5 measurements with fixed and portable, low-cost LoRaWAN-connected sensors

www.nrfirescience.org/resource/21113

Air pollution with PM2.5 (particulate matter smaller than 2.5 micro-metres in diameter) is a major health hazard in many cities worldwide, but since measuring instruments have traditionally been expensive, monitoring sites are rare and generally show only background concentrations. With the advent of low-cost, wirelessly connected...

Author(s): Hugh Forehead, Johan Barthelemy, Bilal Arshad, Nicolas Verstaevel, Owen F. Price, Pascal Perez

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Accessing the life in smoke: a new application of unmanned aircraft systems (UAS) to sample wildland fire bioaerosol emissions and their environment

www.nrfirescience.org/resource/20412

Wildland fire is a major producer of aerosols from combustion of vegetation and soils, but little is known about the abundance and composition of smoke's biological content. Bioaerosols, or aerosols derived from biological sources, may be a significant component of the aerosol load vectored in wildland fire smoke. If bioaerosols...

Author(s): Leda N. Kobziar, Melissa R.A. Pingree, Adam C. Watts, Kellen N. Nelson, Tyler J. Dreaden, Mary Ridout

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Contiguous United States wildland fire emission estimates during 2003-2015

www.nrfirescience.org/resource/18828

Wildfires are a major source of air pollutants in the United States. Wildfire smoke can trigger severe pollution episodes with substantial impacts on public health. In addition to acute episodes, wildfires can have a marginal effect on air quality at significant distances from the source, presenting significant challenges to air...

Author(s): Shawn P. Urbanski, Matthew C. Reeves, Rachel E. Corley, Robin P. Silverstein, Wei Min Hao

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Long-term post-disturbance forest recovery in the Greater Yellowstone Ecosystem analyzed using landsat time series stack

www.nrfirescience.org/resource/14826

Forest recovery from past disturbance is an integral process of ecosystem carbon cycles, and remote

sensing provides an effective tool for tracking forest disturbance and recovery over large areas. Although the disturbance products (tracking the conversion from forest to non-forest type) derived using the Landsat Time Series Stack-...
Author(s): Feng R. Zhao, Ran Meng, Chengquan Huang, Maosheng Zhao, Feng A. Zhao, Peng Gong, Zhiliang Zhu, Le Yu
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Smoke management photographic guide: a visual aid for communicating impacts

www.nrfirescience.org/resource/14538

Communicating emissions impacts to the public can sometimes be difficult because quantitatively conveying smoke concentrations is complicated. Regulators and land managers often refer to particulate-matter concentrations in micrograms per cubic meter, but this may not be intuitive or meaningful to everyone. The primary purpose of...

Author(s): Joshua C. Hyde, Jarod Blades, Troy E. Hall, Roger D. Ottmar, Alistair M. S. Smith
Year Published: 2016
Type: Document
Technical Report or White Paper

Determination of the smoke-plume heights and their dynamics with ground-based scanning LIDAR

www.nrfirescience.org/resource/13611

Lidar-data processing techniques are analyzed, which allow determining smoke-plume heights and their dynamics and can be helpful for the improvement of smoke dispersion and air quality models. The data processing algorithms considered in the paper are based on the analysis of two alternative characteristics related to the smoke...

Author(s): Vladimir A. Kovalev, Alexander P. Petkov, Cyle E. Wold, Shawn P. Urbanski, Wei Min Hao
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Perverse incentives: the case of wildfire smoke regulation

www.nrfirescience.org/resource/14235

Wildfire is on the rise. The United States is witnessing a spectacular increase in acres lost to catastrophic wildfires, a phenomenon fed by the generally hotter and dryer conditions associated with climate change. In addition to losses in lives, property, and natural resources, wildfires contribute thousands of tons of air...

Author(s): Kirsten H. Engel
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Gas-particle partitioning of primary organic aerosol emissions: 3. Biomass burning

www.nrfirescience.org/resource/13476

Atmospheric organic aerosol concentrations depend in part on the gas-particle partitioning of primary organic aerosol (POA) emissions. Consequently, heating and dilution were used to investigate the volatility of biomass-burning smoke particles from combustion of common North American trees/shrubs/grasses during the third Fire Lab...

Author(s): Andrew A. May, Ezra Levin, Christopher J. Hennigan, Ilona Riipinen, Taehyoung Lee, Jeffrey L. Collett, Jose L. Jimenez, Sonia M. Kreidenweis, Allen L. Robinson

Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Highlights of satellite-based forest change recognition and tracking using the ForWarn System

www.nrfirescience.org/resource/12395

Satellite-based remote sensing can assist forest managers with their need to recognize disturbances and track recovery. Despite the long standing availability of raw imagery, the systematic delivery of spatially continuous, ready-to-use, processed products has evaded us until recently. The web-based ForWarn system moves us a step...

Author(s): Steven P. Norman, William W. Hargrove, Joseph P. Spruce, William M. Christie, Sean W. Schroeder

Year Published: 2013

Type: Document

Technical Report or White Paper

FUEGO - Fire Urgency Estimator in Geosynchronous Orbit - A proposed early-warning fire detection system

www.nrfirescience.org/resource/12388

Current and planned wildfire detection systems are impressive but lack both sensitivity and rapid response times. A small telescope with modern detectors and significant computing capacity in geosynchronous orbit can detect small (12 m²) fires on the surface of the earth, cover most of the western United States (under conditions of...

Author(s): Carlton R. Pennypacker, Marek K. Jakubowski, Maggi Kelly, Michael Lampton, Christopher Schmidt, Scott L. Stephens, Robert Tripp

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

A MODIS direct broadcast algorithm for mapping wildfire burned area in the western United States

www.nrfirescience.org/resource/8191

Improved wildland fire emission inventory methods are needed to support air quality forecasting and guide the development of air shed management strategies. Air quality forecasting requires dynamic fire emission estimates that are generated in a timely manner to support real-time operations. In the regulatory and planning realm,...

Author(s): Shawn P. Urbanski, J. Meghan Salmon, Bryce L. Nordgren, Wei Min Hao

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Wildfire smoke: a guide for public health officials

www.nrfirescience.org/resource/12451

Smoke rolls into town, blanketing the city, turning on streetlights, creating an eerie and choking fog. Switchboards light up as people look for answers. Citizens want to know what they should do to protect themselves. School officials want to know if outdoor events should be cancelled. The news media want to know how dangerous the...

Author(s): Michael Lipsett, Barbara Materna, Susan Lyon Stone, Shannon Therriault, Robert Blaisdell, Jeff Cook

Year Published: 2008

Type: Document

Technical Report or White Paper

Photographic handbook for comparing burned and unburned sites within a dry forested and grassland mosaic: a tool for communication, calibration, and monitoring post-fire effects

www.nrfirescience.org/resource/11237

This photograph handbook describes characteristics and burn severity of a dry forested and grassland mosaic that burned within the last decade. We show photographs of different burned and unburned sites to help compare fire occurrence in similar stands. The handbook provides local land managers with a quick, inexpensive, and...

Author(s): Theresa B. Jain, Molly Juillerat, Jonathan Sandquist, Mike Ford, Brad Sauer, Robert J. Mitchell, Scott McAvoy, Justin Hanley, Jon David

Year Published: 2007

Type: Document

Technical Report or White Paper

Treatment of data influenced by exceptional events; final rule

www.nrfirescience.org/resource/12454

This action finalizes a rule to govern the review and handling of air quality monitoring data influenced by exceptional events. Exceptional events are events for which the normal planning and regulatory process established by the Clean Air Act (CAA) is not appropriate. In this rulemaking action, EPA is finalizing the proposal to:...

Author(s): U.S. Environmental Protection Agency

Year Published: 2007

Type: Document

Management or Planning Document, Technical Report or White Paper

Using focus groups to involve citizens in resource management - investigating perceptions of smoke as a barrier to prescribed forest burning

www.nrfirescience.org/resource/11214

Participants in a series of focus groups discussed how their tolerance for smoke varied by the source of the smoke and found their opinions changing as they talked with other participants. Even those opposed to smoke from agricultural burning eventually found smoke from prescribed forest burning would be acceptable under appropriate...

Author(s): Brad R. Weissaupt, Matthew S. Carroll, Keith A. Blatner, Pamela J. Jakes

Year Published: 2006

Type: Document

Technical Report or White Paper

Automated forecasting of smoke dispersion and air quality using NASA terra and aqua satellite data (Task 5) - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11150

This document contains a description of the air quality forecasting system in operation at the Missoula Fire Science Laboratory. This air quality forecasting system has been steadily assimilating new techniques and algorithms as they have been developed over the past four years. Individual components as well as assemblies of...

Author(s): Wei Min Hao, Shawn P. Urbanski

Year Published: 2005

Type: Document

Technical Report or White Paper

Wildland fire in ecosystems: effects of fire on air

www.nrfirescience.org/resource/12587

This state-of-knowledge review about the effects of fire on air quality can assist land, fire, and air resource managers with fire and smoke planning, and their efforts to explain to others the science behind fire-related program policies and practices to improve air quality. Chapter topics include air quality regulations and fire;...

Author(s): David V. Sandberg, Roger D. Ottmar, Janice L. Peterson, John Core

Year Published: 2002

Type: Document

Technical Report or White Paper

Real-time smoke particulate sampling; fire storm 2000

www.nrfirescience.org/resource/11202

Reports the findings of a study comparing the results of instruments measuring smoke particulate in real time to gravimetric samplers in Missoula and Hamilton, Montana, during the summer of 2000. Real-time, particulate monitoring instruments were evaluated to determine their accuracy when measuring smoke particulate concentrations...

Author(s): Andy Trent, Mary A. Davies, Richard Karsky, Richard W. Fisher

Year Published: 2001

Type: Document

Technical Report or White Paper

Hydrocarbon and biomass fuel fire field tests

www.nrfirescience.org/resource/11021

Biomass and hydrocarbon fuel fires are two common sources of obscuring smoke which present significant operational challenges over a broad range of possible viewing wavelengths. This is especially true of very large fires where the primary smoke particles (approx. 0.1-0.3 um diameter) obscure vision by both scattering and absorption...

Author(s): Lawrence F. Radke, Dean A. Hegg, J. David Nance, Jaime H. Lyons, Krista K. Laursen, R. J. Ferek, Peter V. Hobbs, Raymond E. Weiss

Year Published: 1990

Type: Document

Conference Proceedings