

IMPROVE Website

Status and Great Things to Come

Presented to the IMPROVE Steering Committee Wind Cave, SD
September 2009
B.A. Schichtel

IMPROVE's Evolution

IMPROVE Interagency Monitoring of Protected Visual Environments

Home Search Contents Contact

Overview Data Tools Publications Studies Education/Reg Forum Activities Links

Interagency Monitoring of Protected Visual Environments

Our national Parks and Wilderness Areas possess many stunning vistas and scenery. Unfortunately, these scenes are diminished by uniform haze causing discoloration and loss of texture and visual range. Layered hazes and plume blight also detract from the scene. Recognizing the importance of visual air quality, congress included legislation in the 1977 Clean Air Act to prevent future and remedy existing visibility impairment in Class I areas. To aid the implementation of this legislation, the IMPROVE program was initiated in 1985. This program implemented an extensive long term monitoring program to establish the current visibility conditions, track changes in visibility and determine causal mechanism for the visibility impairment in the National Parks and Wilderness Areas.

The purpose of this website is to provide access to the IMPROVE monitoring data resources and educational material on the science of visibility and regulations. First time visitors should visit the Overview section which summarizes the IMPROVE network and visibility science and regulations.

Website Categories

- Data Resources
- Tools
- Publications
- Special Studies
- Visibility & Regulation Education
- IMPROVE & Visibility Overview

IMPROVE Resources

- Database
- Metadata
- Data Advisory, QA/QC
- Graphics
- Photos
- Web Cams
- IMPROVE Reports
- Gray Literature

Bulletins

Diminishing View
West Elk Mountains, Colorado

B_{ext} (Mm^{-1})	20	30	40	60	100	200	300	500		
Deciviews	4	7	11	14	18	23	30	34	37	39
V.R. (km)	200	130	100	65	40	20	13	10	8	

< Stop Loop >

- Data
- Tools
- Publications
- Special Studies
- Education
- Activities

IMPROVE Website Purpose

- Transparency: Document IMPROVE activities: committee, laboratories, users
- Traceability: Document and provide access to ancillary data
 - Database version control with documentation (currently not done)
 - **IMPROVE network operations metadata access/links**
 - **Calibration factors**
 - **Blank corrections**
 - **..... Metadata task force discussion**
- Inform users of data QA/QC activities and issues
- Provide access to educational material and documents on visibility issues, science and regulations

IMPROVE/VIEWS Growing International User Community

- 2200 unique visitors in an average month
- Visitors from 164 different countries have accessed the websites including visitors from Seychelles Islands, Republic of Djibouti and Anguilla Caribbean Island
- VIEWS
 - 1500 registered users from over 500 organizations, institutions, universities, and companies
 - 7000 unique visitors per month
 - Millions of page views per year
- Hundreds of other websites [Link to IMPROVE and VIEWS](#)

Additions - Data

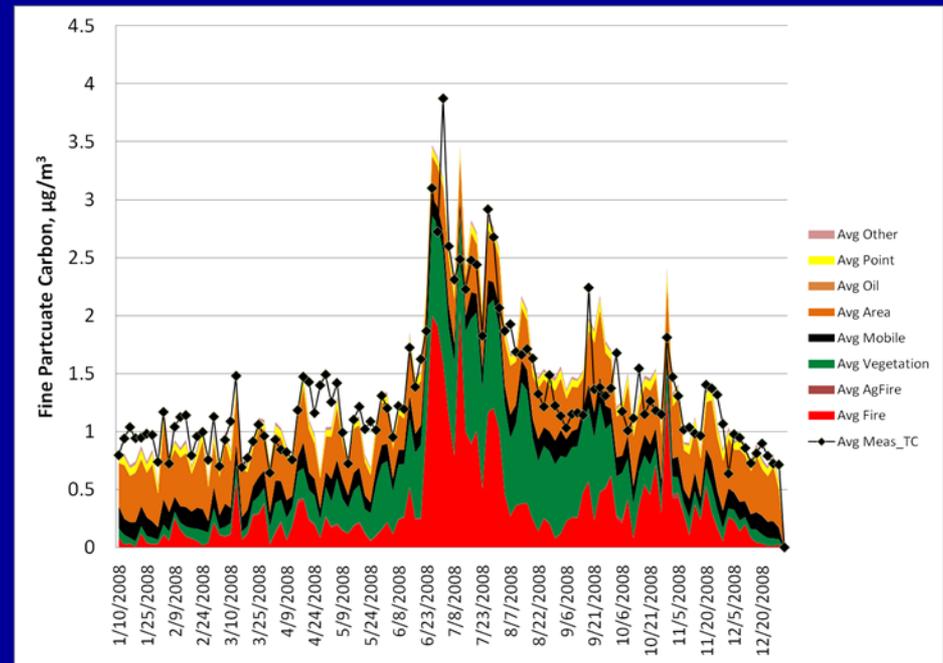
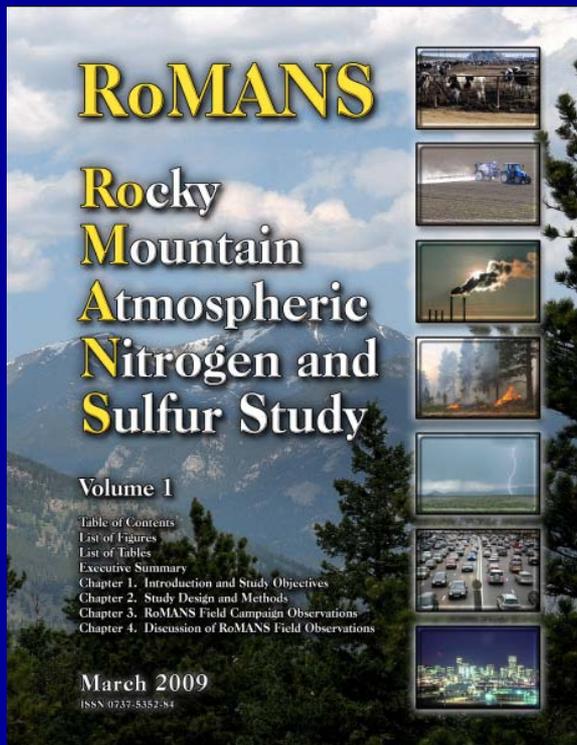
- IMPROVE aerosol data update - periodically
 - Final data is available through **October 2008**
 - Added two years of data over the last year
 - Complete preliminary data: **Oct – Dec 2008**
 - Incomplete preliminary data (mass, ions, C): **None**
- Optical data updates
 - Nephelometer scattering data (quarterly)
 - 1993 through **Mar 2009** data available from online database.
 - Transmissometer extinction data (annually)
 - USFS : Bridger and San Gorgonio through 2008
- The 9/1988- 11/1993 NESCAUM particulate data
 - 9 sites in new England following IMPROVE protocol

Additions – Data Continued

- Regional Haze Rule Metrics: best and worst 20% haze days
 - RHR1 (old algorithm) data available through 2004
 - RHR2 (new algorithm) data available through 2007
 - Not all aggregations have been added to the database
 - Data visualization tools are up to date
- Data issues resolved last year
 - Mis-reporting of light-abs on masked filters (data advisory #21)
 - Invalid data for collocated samples (data advisory #20)
- Data issue to be resolved this coming year
 - Under-correction of Cl- for filter blank levels (data advisory #24)
 - Will update the 2005-08 Cl- data soon

Additions – Special Studies

- Rocky Mountain Atmospheric Nitrogen and Sulfur Study (coming soon)
- Apportionment of Biomass Burning Contribution to Haze and PM2.5 – Supported by the Joint Fire Science Program.



Additions - Documents

- 2009 IMPROVE Calendar
- 2008 IMPROVE Steering Committee Meeting Presentations
- Latest IMPROVE newsletters and meeting minutes
- No New SOPs
- Data Advisory
 - New: Data losses during episodes of heavy smoke
 - Update to da0012: Inconstant bias in XRF sulfur – Advisory
 - Limited Life: Under-correction of Cl⁻ concentrations for filter blank levels
 - Retired: Mis-reporting of light-absorption on masked filters
 - Invalid data for collocated (POC = 2) samples
- UCD QA/QC quarterly reports 1st – 3rd quarter 2008

Additions – Documents / Education

- Gray Literature
 - Summary of Urban Visibility Workshop and Presentations addressing changes to the visibility secondary NAAQS standard, Denver, CO
- Next Round of EPRI Reports from Peter Mueller
 - Colucci et al., Sulfur oxides: Current status of knowledge
 - 5 reports on data and finding from the Sulfate Regional Experiment (SURE) Program
 - These reports are being scanned in and will be available soon
- Educational Interactive Tutorials
 - The Impacts of haze
 - Reactive N cycling through the atmosphere and ecosystem

Educational Section: The impact of haze section added to “Exploring Visibility Concepts”

IMPROVE

Interagency Monitoring of Protected Visual Environments

Click any section buttons below, including highlighted ones, to see other pages.

Introduction

Impacts of Haze

Science of Visibility

Particulates Matter!

Measuring Haze

Managing Haze

What Can You Do?

Impacts of Haze



- Natl. Park Service IMPROVE site
- Natl. Forest Service IMPROVE site
- US Fish and Wildlife Service IMPROVE site

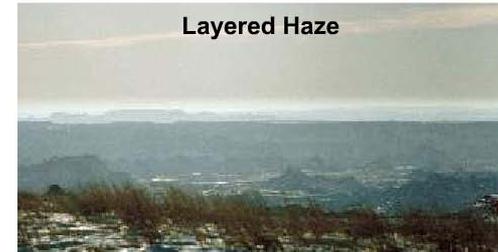
Click a dot in the map to see how haze affects that park or wilderness area.

Badlands National Park, South Dakota

Clear



Layered Haze



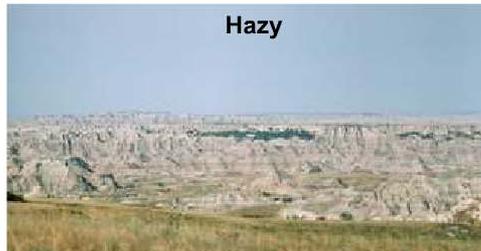
Average



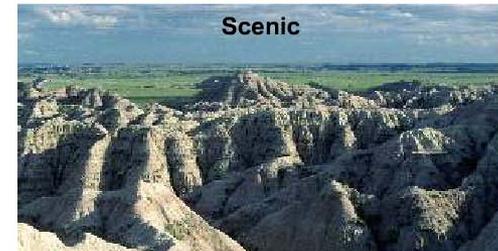
Fire



Hazy



Scenic



Haze is an integral part of the view, even in remote areas of the United States. Visibility impacts are seen in virtually all our national parks and wilderness areas. Poor visibility is often the first indicator that other impacts we cannot observe so directly are also occurring to natural resources.



IMPROVE Home

VIEWS

VIEWS-2 Launches Today!



VIEWS

Visibility Information Exchange Web System

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Data

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VIEWS Reference

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Related Sites

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[IMPROVE](#)
[Air Toxics](#)
[DataFed](#)



Air Quality Data, Tools, & Resources

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VIEWS is an online system of tools and resources designed to provide easy access to a wide variety of air quality data. An advanced data acquisition and import system is used to integrate data from dozens of sources into a single, highly-optimized data warehouse in order to enable users to analyze datasets of widely-varying origin in a consistent, unified manner with a common set of tools and web services. [More information...](#)

Air Quality Data

- ▶ Query Wizard
- ▶ Data Files
- ▶ Dataset Inventory
- ▶ Network Browser
- ▶ Site Browser
- ▶ Summary Data

Air Quality Tools

- ▶ Contour Maps
- ▶ Trends Analysis
- ▶ Composition Analysis
- ▶ Spatial Patterns
- ▶ Back Trajectories
- ▶ Air Quality Index Maps

Air Quality Resources

- ▶ Documents
- ▶ Webcams
- ▶ Photographs
- ▶ Glossary
- ▶ Links
- ▶ Developers

News and Notes

08.31.2007 - [New page: Dataset Index](#)

A comprehensive list of the datasets available on VIEWS is being developed. When complete, these Dataset Descriptions will contain complete information on each individual dataset, including the parameters measured, the geographical extent, the frequency and duration of observations, the sampling and analysis methods used, and how to find and access the data on the VIEWS website. An incomplete, draft version of the index can be found here.

04.13.2007 - [New data: IMPROVE RHR2 Data](#)

New Regional Haze Rule data is available in raw form here. (See the note below for FTP login information.) NOTE: This data has not been imported into the integrated database yet, but is available in raw *.csv format in the meantime. If you have any questions about this data, please contact us. Thank you!

04.12.2007 - [Important Note: FTP Site Restrictions](#)

Due to problems with unauthorized access we can no longer allow anonymous access to our public FTP site. From now on, you will be prompted to login when accessing FTP resources, so please use the following information to do so: Username: cira\guest, Password: orion. Thank you!

10.24.2006 - [IMPROVE Steering Committee Meeting 2006](#)

Final summary of the Sept 26-28 IMPROVE Steering Committee meeting Meeting Summary.

Air Quality and Environmental Science News

[Melting Of The Greenland Ice Sheet Mapped](#) (Thu, 17 Sep 2009 02:00:00 EDT)

Will all of the ice on Greenland melt and flow out into the sea, bringing about a colossal rise in ocean levels on Earth, as the global temperature rises? The best answer is probably the ice is not actually melting now. Danish research from 2006 shows that the melting of the

Data Updates

- 08/31/07 IMPROVE Aerosol, Raw
June through August, 2006
- 08/31/07 IMPROVE Aerosol, Prelim.
June through August, 2006
- 08/31/07 IMPROVE Nephelometer
January through March, 2007
- 08/31/07 IMPROVE Aerosol, Raw
June through August, 2006
- 08/31/07 IMPROVE Aerosol, Prelim.
June through August, 2006
- 08/31/07 IMPROVE Nephelometer
January through March, 2007
- 08/31/07 IMPROVE Aerosol, Raw
June through August, 2006
- 08/31/07 IMPROVE Aerosol, Prelim.
June through August, 2006

Features

[Natural Haze Levels II Data:](#)

The 2nd version of the natural haze level II estimates based on the work of the Natural Haze Levels II Committee.

[IMPROVE Data Update and Archival Protocol:](#)

A summary of the procedures used by NPS/CIRA to update and archive IMPROVE data.

[IMPROVE Substituted Data:](#)

Data that has been substituted for missing sample days at various IMPROVE Sites that experienced data completeness issues with regard to the RHR guidance for determining baseline conditions.

[VIEWS Air Quality Glossary:](#)

An improved and expanded version of our glossary of air quality terms.

[Data Flagging Protocols:](#)

A description of the conventions



Show Photos Show Site History

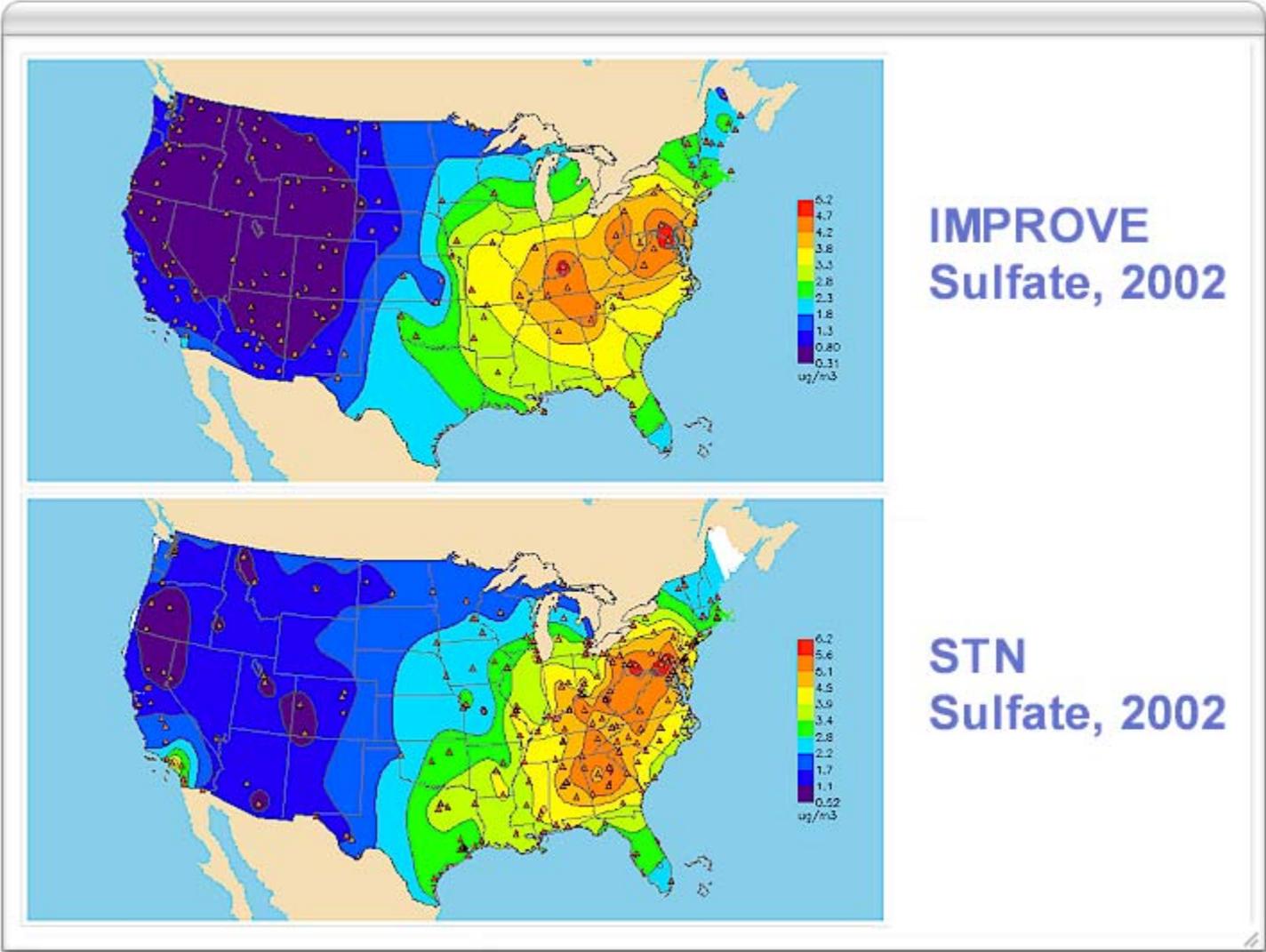
Big Bend NP (BIBE1)

Site Details

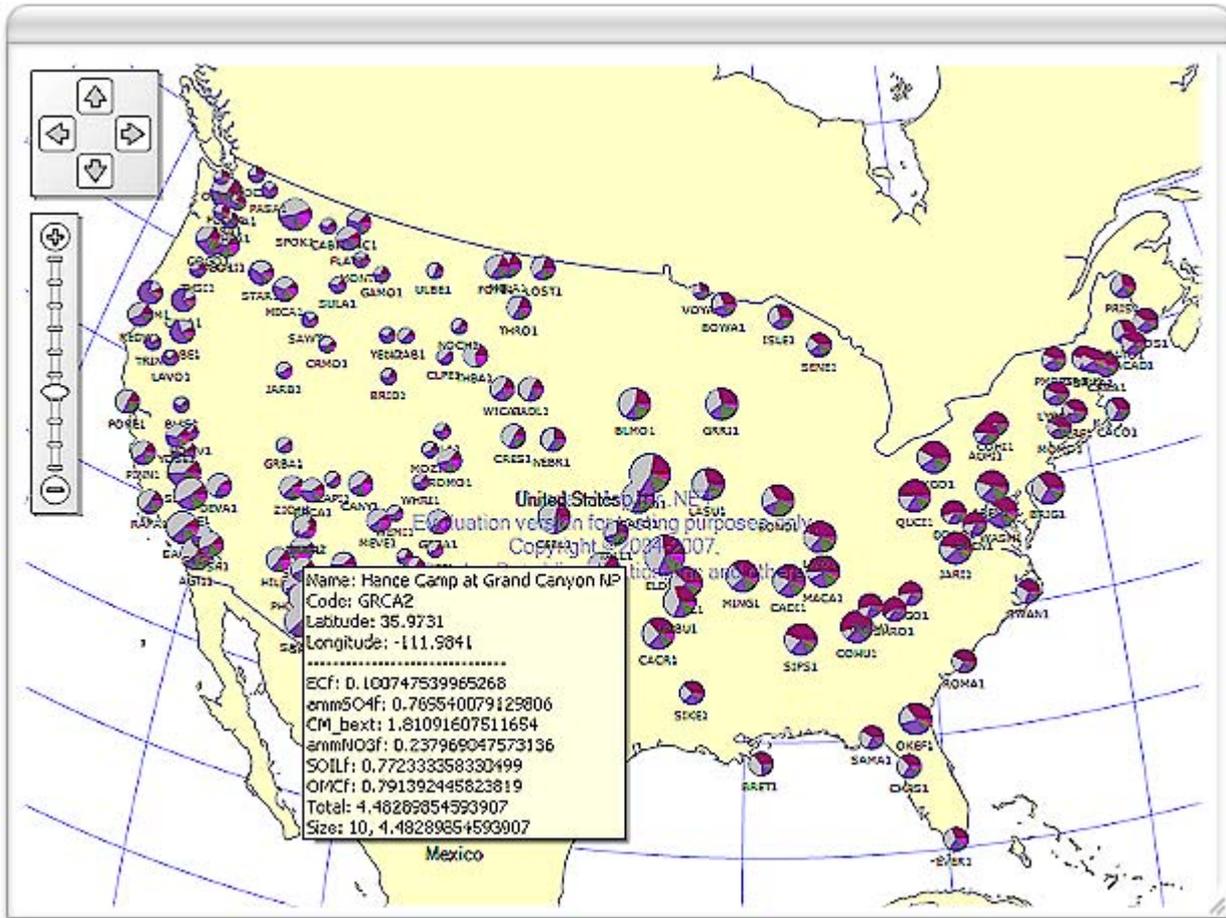
Country: United States
 State: Texas (pop. 16986510)
 County: Brewster County (pop. 8681)
 Location2: 3 miles SE of Panther Junction, at water well
 Latitude: 29.3027
 Longitude: -103.178
 Elevation: 1066m above MSL
 EPA Code: 480430101
 Agency: U.S. National Park Service
 Sponsor: NPS
 Region: West Texas
 Land Use: Unknown
 AQCR: Unspecified
 Dates: 3/1988 - Present
 SiteID: 31
 SiteCode: BIBE1
 SiteName: Bin Bend NP



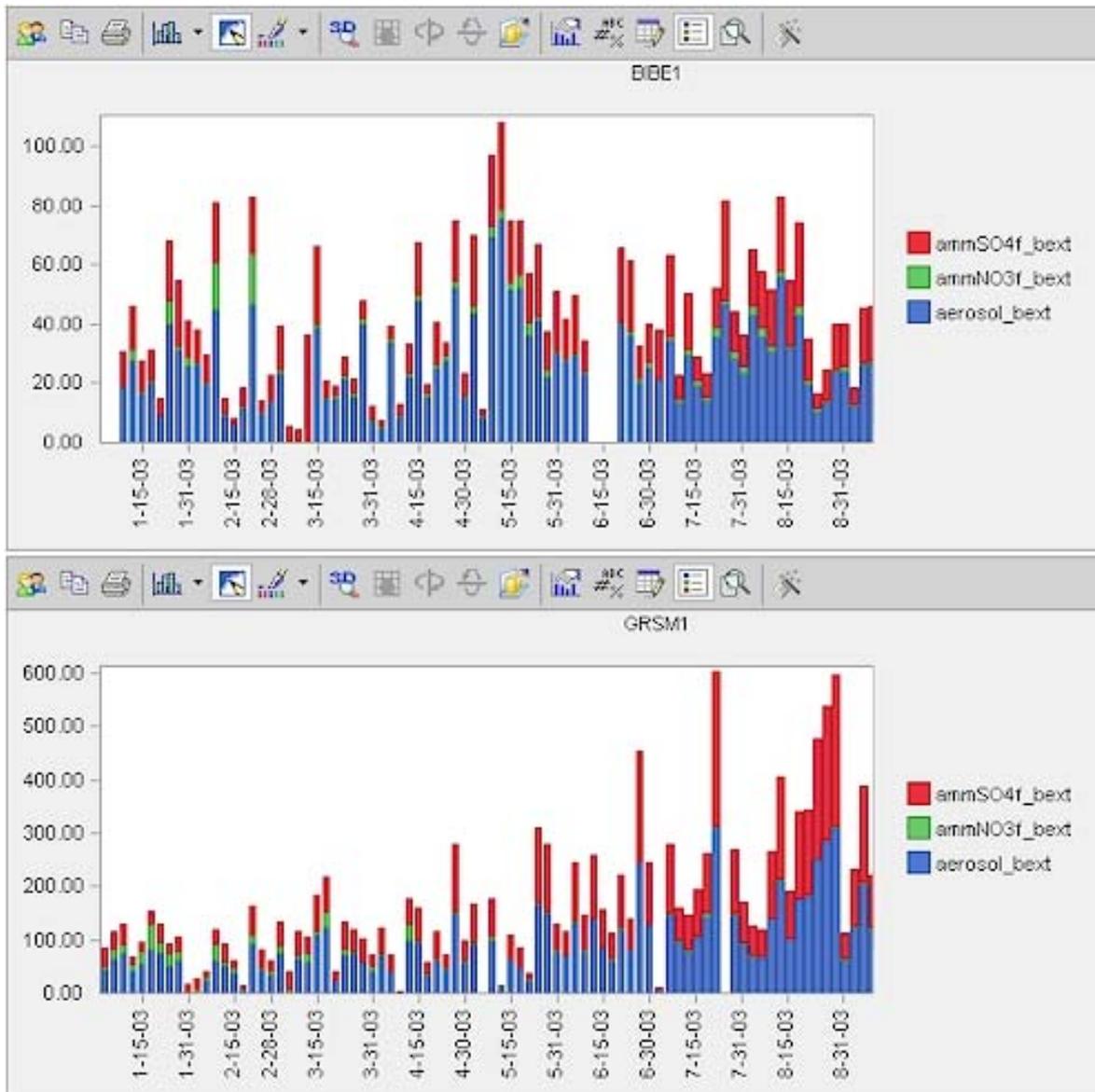
IEWS/TSS Analysis Tools: Dynamic Contour Maps



IEWS/TSS Analysis Tools: Dynamic Data Maps



IEWS/TSS Analysis Tools: Dynamic Time Series





Download Raw Data

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Select Products

Select Datasets

Select Sites

Select Parameters

Select Dates

Select Fields

Select Filters

Output Options

1

Select Datasets:

Dataset	Description	Frequency
Air Sciences Speciated Aerosol	PM2.5 Speciation	Daily
AQS Ozone, Hourly	Ozone	Hourly
AQS PM10 Mass, Daily	PM10 Mass	Daily
AQS PM10 Mass, Hourly	PM10 Mass	Hourly
AQS PM2.5 Mass FRM, Daily	PM2.5 Mass	Daily
AQS PM2.5 Mass FRM, Hourly	PM2.5 Mass	Hourly
AQS PM2.5 Speciation, Daily	PM2.5 Species	Daily
CASTNet Dry Deposition	Dry Deposition	Daily
CASTNet Visibility Chemistry	Speciation, Visibility	Daily
Guelph Aerosol and Visibility Monitoring	Speciation	Daily
IMPROVE Aerosol	Speciation, Visibility	1 day in 3
IMPROVE Aerosol, Preliminary	Speciation, Visibility	1 day in 3

IMPROVE Aerosol

The Interagency Monitoring of Protected Visual Environments (IMPROVE) program is a cooperative measurement effort governed by a steering committee of representatives from Federal, state, and regional organizations. The IMPROVE monitoring program was established in 1985 to facilitate the creation of Federal and State implementation plans for the protection of visibility in Class I areas (156 national parks and wilderness areas) as stipulated by the 1977 amendments to the Clean Air Act.

Parameters: PM2.5 mass; PM2.5 elemental, ionic, and carbon composition; PM10 mass

Extent: North America > United States > Class I Areas

Sites: 198

Params: 61

Records: 8999824

Frequency: 1 day in 3

Duration: 24 hours

Method: Field Measurement; IMPROVE Aerosol sampler

Stratum: Surface

Start Date: 3/2/1988 12:00:00 AM

End Date: 12/31/2007 12:00:00 AM

Website: [IMPROVE](#)

Tech Contact: [Bret Schichtel, NPS](#)

IT Contact: [Shawn McClure, CIRA](#)



end