AIRNow-International

The future of the United States real-time air quality reporting and forecasting program and GEOSS participation

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What is AIRNow-International?
- Software
- A Community...
  - Shanghai China pilot

System Capabilities

Program Goals
- Current Status
- Promoting the sharing air quality data globally
What is AIRNow-International?

- **New AIRNow Software package**
  - Complete redesign of the U.S. AIRNow system
    - AIRNow is the national real-time reporting and forecasting system for air quality for the States
  - Collect, process, map, and distribute real-time environmental information (not just air)
  - Microsoft SQL Server platform
  - New GIS-based mapping software (ESRI)
    - Geospatial, World-wide mapping capability
    - Map other datasets (e.g., multiple pollutants, aq model outputs)
    - Data fusion possible
  - Data and Information Management Systems
What is AIRNow-International?

• **Services approach...Web 2.0 friendly**
  – Readily distribute data
  – Greater flexibility (sites, geographic extent, parameters, date/time, units, duration, and aggregation)
  – Outputs: CSV, KML, NetCDF, GRIB2, Shapefiles, CAP

• **Built with open components/standards**
  – Easily adopted by agencies/organizations
  – Multiple language support
  – Portable, flexible, and sustainable
  – Opportunity for leveraging tools and expertise
AIRNow-International System
(Conceptual and Functional Design & Data Flow)

Data Inputs ➔ Processing, QA, Reporting ➔ Outputs

Administration of the System
AIRNow Data Management System (DMS)
AIRNow Information Service
AIRNow Mapper
AIRNow Database

Data Files
Web Service
Web Services*
Maps*
Data Files*
Maps* Image layers*

*Outputs will conform to standards to promote sharing and interoperability
What is AIRNow-International?

• Part of a growing ‘Community’
  – U.S. AIRNow has always been more than software...
    • Regional cooperation and daily interaction with stakeholders
    • Annual conferences
  – Initial pilot of AIRNow-International: Shanghai, China
    • 2010 World Expo
    • help Shanghai visualize, forecast and report air quality conditions

• International collaboration and knowledge exchange
  – Promote local, national and international data exchange
    • Agency to Agency
    • Agency to the Public
    • GEOSS
  – Promote data standardization via GEOSS

➡ The goal of improving data exchange and access is achieved by building this community
AIRNow-International Concept

United States AIRNow

Shanghai ‘AIRNow’

GEOSS-Registered Web Services

Other Nations ‘AIRNow’

Other Data Providers

Other Data Consumers

= monitoring site

= data transfer

= web service
AIRNow GEOSS Participation

GEOSS Common Infrastructure

- GEO Web Portals
- GEOSS Clearinghouses

Registries
- Components & Services
- Standards and Interoperability
- Best Practices Wiki
- User Requirements

Air Quality Community Portal

AIRNow International
- EPA
- AIRNow

Registers

Users

Find

Find

Searches

Registers

Registers

Registers
AIRNow-International Capabilities

- **Multiple file outputs**
  - Comma Separated Value (CSV)
  - NetCDF and GRIB2
  - Available via web service or FTP
  - New AQCSV format
    - Standardize air quality data exchange?
  - RSS and CAP feeds
  - Web Services
    - Web Mapping Service
    - Web Feature Service
    - Web Coverage Service
- **KML files (Google Earth) and Shapefiles**
RSS AIRNow Gateway Feeds

AIRNow GATEWAY

AIRNow Feeds
Subscribe to air quality forecast and Action Day notifications by city. Daily forecasts are available in RSS format. Common Alerting Protocol (CAP) feeds are available in both CAP XML format and as an Atom feed.

Forecast city selection
Please pick a State: [MI]

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<th>City</th>
<th>RSS Forecast</th>
<th>RSS Action Day</th>
<th>CAP Forecast</th>
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RSS Feeds
AIRNow-International Web Services

- **Web Services will be URL based initially (RESTful)**
  - Web Mapping Service
    - Return map images with desired data displayed (contour map)
  - Web Feature Service
    - Returns geographic map features (not map images)
      - Shapefiles or GML
  - Web Coverage Service
    - Returns data for points or a gridded coverage area
    - CSV, KML, NetCDF, or GRIB2

- **How can the air quality community use them?**
  - A data feed for internal applications and/or web sites
  - A data feed for GEOSS via the Air Quality Portal/Catalogue
  - Excel spreadsheets
  - Google docs
  - Visualization tools
Example - Web Service Data Request
• KML files (Google Earth)
  – U.S. AIRNow currently has national KML file
    • Current conditions, today/tomorrow air quality forecast
  – More KML files and/or web service calls will be available in AIRNow-International system
  – Why KML initially versus web mapping service?
    • open source
    • lots of applications can use KML
    • easy to use KML on your website
    • allows others to view your data
  – Easy to develop versus building web based GIS system to visualize data
  – Shapefiles will be available as well
Google Map Examples

California

Ohio
AIRNow-International Goals

• **2009**
  – Install AIRNow-International in Shanghai – June
    • Extensive testing
  – Replace existing AIRNow system in United States - September
  – **Begin** building the ‘community’ – late 2009
    • Create forum for exchange – collaborative web site
    • Outreach to current partners – share/exchange data
    • Broader GEOSS participation

• **2010**
  – Operation at World Expo in Shanghai
  – Further develop the community
  – Explore interest in future partners

• **The Long Term**
  – Grow the community
  – Deploy system to future partners
  – Promote data sharing worldwide