Summary Report on
New IT Research Possibilities to Advance Environmental Research, Policy and
Management Panel
dgo2003

The panel on IT research possibilities to advance environmental research and management was attended by about 40 – 50 dgo participants. Sue Stendebach of NSF's Digital Government Research Program moderated, leading off by threading the necessary interrelationships between IT and environmental protection.

Terry Keating, Science Advisor to EPA's Assistant Administrator for Air and Radiation, set the stage, by laying out some of the related work that is currently taking place at EPA, and the IT challenges that the Air Office and others face. These include:

Air Quality Forecasting
- Data Transfer & Processing Speed & Reliability
- Data Visualization & Communication Effectiveness
- Forecasting Performance Evaluation

Community Based Management
- New Users (Local Governments, Public)
- New Connections between Air Quality & Emissions and Land Use, Transportation, & Commercial Activity
- Enabling Multi-Source, Multi-Pollutant, Multi-Media Assessment

International Transport of Air Pollutants
- Satellite-Based Remote Sensing of Concentrations & Emissions Activity
- Integrated Data Analysis (Surface Observations, Satellite Observations, Model Predictions)

Ed Hovy of USC, ISI, followed by detailing his work of integrating tremendous amounts of heterogeneous data, and appropriately mapping the data via machine translation. He elaborated with an example of EPA air quality data that must be gathered from numerous state and regional entities across the country. The current focus is on statistical methods to learn mappings across languages. Ed's work entails learning alignments/mappings in layers:
- Individuals: Cell-to-cell
- Group of cells: column-to-column
- Metadata: header-to-header (etc.)
- Groups of groups: sets of columns -to- sets of columns

Stefan Falke of Washington University, St. Louis, outlined his early work and future plans with EPA on the Networked Environmental Information System for Global Emissions Inventories (NEISGEI). Beginning with a pilot focusing on a U.S. fire, smoke and air quality network, Stefan's research involves building a network that will consist of web-based data access and analysis facilities that are flexible and adaptive in meeting the diverse end use requirements of fire managers and air quality planners. He plans to provide:
- uniform access to and cataloging of distributed fire related data and tools
- easy-to-use interfaces for exploring fire related resources
- powerful tools that contribute to fire related data analysis and modeling
- a framework that encourages community-wide contributions

Alan MacEachren, of Penn State University's GeoVISTA Lab, described ongoing and new research intended to enable productive work in environmental science, policy and management. Alan first discussed open source development of component-based tools and mechanisms to integrate them, via GeoVISTA Studio built by Alan and colleagues. He elaborated, by explaining development of geo-collaboratories to support knowledge construction and sharing, using GeoVISTA's Human-Environment Regional Observatory (HERO). Combining the tools, he is providing the ability to extract concepts from ontologies, integrate and put into meaningful data, and end up with a visual analysis, with resulting map overlay. Alan's new work addresses geo-

collaborative responses to crisis, with the involvement of numerous government partners, including EPA.