MEETINGS

Workshop Establishes the Northeastern Soil Monitoring Cooperative

Workshop to Establish a Coordinated Soil Monitoring Network in the Northeastern U.S. and Canada, New York Water Science Center, Troy, N.Y., 6–7 March 2007

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Environmental monitoring is an essential tool for identifying changes in the biosphere. The need for environmental data has led to national programs to monitor atmospheric deposition, the composition and growth of forests, and the chemistry of lakes and streams in regions affected by acidic deposition. However, there has been no organized effort to monitor changes in soils despite their importance to agriculture, forests, wetlands, and water quality.

The lack of attention given to soil monitoring can be attributed, in part, to questions regarding its feasibility. Do soil changes occur too slowly to warrant monitoring, or is spatial variability too great to detect change? Within the past 15 years, however, changes in soil chemistry have been measured through repeated sampling in eastern North America and in Europe in a variety of soil types, over sampling intervals as short as 5 years. As the number of studies grows, so too does the recognition that methods of sampling and analysis are not always compatible and methods for archiving are not well developed.

To promote the coordinated collection of high-quality data on soil change, the first workshop on monitoring of northeastern U.S. and eastern Canada soils was held to organize interested individuals and institutions into a cooperative network. The workshop was sponsored by the Northeastern States Research Cooperative and the New York State Energy Research and Development Authority. Representatives from nine government agencies from the United States and Canada participated along with faculty and students from eight academic institutions.

The workshop began with invited presentations on the possibilities and pitfalls of soil resampling by Arthur Johnson (University of Pennsylvania), Daniel Richter (Duke University), and Scott Bailey (USDA Forest Service). The next segment of the workshop involved discussions in which the mission of the cooperative was defined and specific objectives were identified, such as the development and sharing of field and laboratory protocols, the compilation of an inventory of historic and ongoing studies that could contribute information on soil change, and the design of a rigorous data collection program that will address emerging issues, as well as provide long-term continuity. Discussion followed on the steps needed to accomplish these objectives, including how to design sampling plots, appropriate methods for soil collection, the need for shared reference samples, and the development of effective archiving protocols. An additional objective of the cooperative will be to synthesize available information on methods into recommendations that will be published as agency or institutional reports.

On the second day of the workshop, task groups were formed to address issues involving methods, compilation of available data, and identification of ongoing studies. A steering committee was formed to guide the ongoing development of the cooperative. A journal article that will serve as a literature review of soil resampling was also outlined by interested workshop participants. A second workshop is planned for late fall 2007. For more information, contact workshop organizers Greg Lawrence (glawrenc@usgs.gov; 518-285-5664) or Scott Bailey (swbailey@fs.fed.us; 603-535-3262). Web site planning is in the early stages, but information is available at http://www.czen.org/node/364

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Formation, Dynamics, and Impact of Plasmaspheric Plumes

Workshop on Plasmaspheric Drainage Plumes, Taos, New Mexico, 9–13 October 2006

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Plasmaspheric plumes result from erosion of the plasmasphere. The Institute of Geophysics and Planetary Physics (IGPP) Workshop on Plasmaspheric Drainage Plumes was convened in Taos, N. M., on 9–13 October 2006 to examine outstanding questions about the formation and dynamics of plumes, and the impact of plumes on the near-Earth space environment (geospace). A second workshop on plasmaspheric drainage plumes is planned for late 2007.

The plasmasphere is an upward extension of the Earth's ionosphere. It is a region of relatively dense, cool plasma (100 to 10,000 electrons per cubic centimeter and of the order of 10^4 K) surrounding the Earth out to a boundary known as the plasmapause. The plasmasphere's size and shape depend on conditions in geospace.

Disturbances such as geomagnetic storms and substorms are triggered by the solar wind (the Sun's outward streaming atmosphere). These disturbances impose a global sunward convection on the plasmasphere. Caught up in this sunward convection, the outer plasmasphere is stripped away, a process known as plasmaspheric erosion. Erosion results in a global reduction of the size of the plasmasphere. On the dayside, it produces plumes of eroded plasma that extend sunward in the prevailing convection stream. In the aftermath of erosion events, plumes rotate and wrap around the main plasmasphere, and diffusion of ionospheric plasma into space—called ionospheric outflow—gradually replenishes the eroded plasma.

Plasmaspheric erosion and the plumes produced by it are of fundamental importance for the dynamics of the near-Earth space environment. The IGPP workshop examined many existing questions and puzzles concerning the details of plume formation, dynamics, and influence on the rest of Earth's space environment.

1. *The fate of plasmaspheric plumes:* Where does eroded plasma go? Does it drain into or intermingle with the solar wind? Is it carried over the Earth's magnetic polar cap and possibly onto the nightside?

2. *Ionospheric signatures of plumes:* How closely coupled are the dynamics of the plasmasphere and the ionosphere that underlies it? What are the precise conditions required for a plasmaspheric plume to have a corresponding structure in the ionosphere? Can ionospheric outflow affect the density of plumes if they are dragged over the polar cap?

3. *Plumes over the American sector:* New results presented at the workshop suggest something unexpected: Plasmaspheric and plume densities apparently have a peak at about 75 degrees west geographic longitude (eastern United States and Canada). Can we verify and explain this apparent dependence?

4. *Space environmental impact of plumes:* During and after magnetospheric storms, hot (millions to billions of kelvins) particles distort the geomagnetic field and increase radi-