was honored for work that the Explorers Club says has "revolutionized the field of climate change through the discovery of abrupt climate change and human impacts on the chemistry of the atmosphere." **Julie Palais**, who directs the Antarctic Glaciology Program in the U.S. National Science Foundation's Office of Polar Programs, was honored for research into the use of volcanic ash in ice cores to study the paleoclimate record of the Greenland and Antarctic ice sheets. **Susan Solomon**, a senior scientist at NOAA's Earth System Research Laboratory in Boulder, Colo., is known for her climate and ozone work, including research that led to discovering the cause of the Antarctic ozone hole. Solomon also cochairs Working Group I of the Intergovernmental Panel on Climate Change.

MEETINGS

A New Perspective on the Earth's Plasmasphere

The Earth's Plasmasphere: A Cluster, IMAGE, and Modelling Perspective; Brussels, Belgium, 19–21 September 2007

PAGE 524

Sixty years ago, Owen Storey concluded that "whistler" radio waves propagate along the geomagnetic field lines through a dispersive medium, which is now known as the plasmasphere. This was confirmed by Gringauz's plasma measurements on Lunik 2 in 1962. In recent years, satellites such as NASA's Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) and the European Space Agency's Cluster probes have offered what previous spacecraft could not: a nonlocal perspective.

As IMAGE and Cluster have accumulated more than 6 years of observations, researchers from both communities judged the time was ripe for a review at a workshop organized last September by the Belgian Institute for Space Aeronomy (http://www.aeronomy.be/en/workshop/plasmasphere/overview.htm). This meeting report summarizes some highlights of the meeting.

An important topic discussed involved the emergence of new methodologies for analysis of IMAGE and Cluster data. IMAGE, which ceased operations in 2005, carried an extreme ultraviolet (EUV) imager that produced global plasmasphere pictures every 10 minutes by recording resonantly scattered helium ion (He^+) emission at 30.4 nanometers. The rich detail in these images has inspired a new morphological nomenclature (http://image.gsfc.nasa.gov/poetry/discoveries/N47big.jpg). Presentations at the meeting showed how the EUV team can infer the flow field by cross-correlating details in subsequent images. IMAGE's radio plasma imager (RPI) wave instrument provides a picture of its environment by active radio sounding, thereby discovering, for instance, wave ducts of finite extent along the magnetic field lines.

Other sessions revealed how the four-spacecraft Cluster constellation gives an idea of larger-scale structure in the plasmasphere when the spacecraft separation is large. For small separations, diverse techniques allow computing the magnetic field gradients—and thus the currents—as well as the density gradients (density inferred from the plasma frequency identified by the WHISPER (Waves of High Frequency and Sounder for Probing of Electron Density by Relaxation) instrument).

These new methodologies have created a greater understanding of plasmasphere dynamics, which evolve in a cyclic pattern. Presentations covered how the plasmasphere is refilled from the ionosphere in a slow bottom-up process when the solar wind is steady and the magnetospheric electric field is constant. The plasmasphere thus becomes wider and denser, and it has no sharp outer boundary. Further, the Cluster/CODIF (Composition and Distribution Function Analyzer) ion spectrometer, in its cold plasma detection mode, has potentially revealed the existence of an outward plasmaspheric wind in this situation. When a strong solar wind disturbance sets in, the electric field intensifies and erodes the outer regions of the plasmasphere. This produces a sharp outer density gradient (the plasmapause). The eroded material forms a plume, initially in the afternoon sector, sometimes extending up to the dayside magnetopause. The nightside edge of the plume foot point seems to coincide with the intense electric fields associated with ionospheric subauroral ion drifts. As time goes by, the plume rotates around Earth, often at a speed slower than the Earth's rotation. Plumes can extend over a wide local time sector; while IMAGE EUV shows their high-density part (down to about 40 particles per cubic centimeter), Cluster sometimes samples the prolongation of these plumes to earlier local times, at even lower densities. Conference sessions reviewed how numerical simulations support the proposed theories.

Additionally, IMAGE and Cluster contribute to empirical models of the plasma density in the inner magnetosphere, and of the electric field that drives the convection. Models of the broad variety of plasma wave emissions reported by both missions will be useful for understanding the time evolution of the radiation belts.

—JOHAN DE KEYSER, FABIEN DARROUZET, and VIVIANE PIERRARD, Belgian Institute for Space Aeronomy, Brussels; E-mail: Johan.DeKeyser@aeronomie.be

Toward a Networked Publication and Library System for Scientific Data

World Data Center Conference 2007; Bremerhaven, Germany, 7–9 May 2007

PAGE 524

Almost 50 years ago, the World Data Center (WDC) system was founded through the International Council for Scientific Unions (ICSU) in order to archive and distribute data collected from the observational programs of the 1957–1958 International Geophysical Year. Originally established in the United States, Europe, Russia, and Japan, the WDC system has since expanded to 51 centers in 12 countries. Its current holdings are transdisciplinary and include a wide range of solar, geophysical, environmental, and human dimensions data covering timescales ranging from seconds to millennia. These data provide the baseline information for research in many ICSU disciplines, but especially for monitoring changes in the geosphere and biosphere.

In order to revise a 50-year-old structure and to develop appropriate short- and medium-term strategies, a WDC conference was convened in Bremen, Germany. Hosted by the World Data Center for Marine Environmental Sciences (WDC-MARE) and the Alfred Wegener Institute for Polar and Marine Research, and supported by the German Science Foundation (DFG) and the ICSU, the conference was dedicated to four main subjects:

1. *WDC and GEOSS:* The current Global Earth Observation System of Systems (GEOSS) effort is conceived for synoptic access and large-scale and complex analysis of all types of empirical data. All subscribing nations have a unique role in developing and maintaining the system, collecting data, enhancing data distribution,