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Celebrating Polar Science

AS WE ENTER THE FOURTH INTERNATIONAL POLAR YEAR (IPY), WE HONOR THE FACT THAT although the poles are among the most desolate places on Earth, they are also among the most scientifically rich and important to the future of the planet. The first of these “geophysical years” was 1882–1883; the most recent was 1957–1958. By now, most people know that the poles are ideal places to study the effects of global climate change. Indeed, some have called polar glaciers and ice sheets the “canaries in the mine” of climate change.

Because the impacts of climate change are disproportionately felt at high latitudes, polar ecosystems will continue to bear careful watching. Cores through the polar ice shelves into the underwater sediment provide a record of Earth’s biological and geological history over millions of years. The Arctic has also given us a history of human settlement and associated climate records that span thousands of years and offer an outstanding base for integrated research on global systems and human adaptation. The poles are also home to some of the most unusual species, living successfully in incredibly cold and dark water hundreds of meters under the ice.

The air is so pristine that scientists at the Amundsen-Scott South Pole Station, poised atop a constantly shifting ice sheet several miles thick, give out little vials labeled “cleanest air on earth.” That air provides a matchless environment in which cosmologists and astronomers can study the origins and evolution of the universe. Their work will be accelerated by a brand-new 10-meter telescope, transported to the South Pole in sections on turboprop freight planes and assembled outside at -60°C . Work also continues on the world’s largest neutrino detector, called IceCube, which after 6 years of work will occupy a cubic kilometer of ice beneath the South Pole Station.

Antarctic polar ice turns out to be an ideal medium for detecting neutrinos because it is exceptionally pure, transparent, and free of radioactivity.

The IPY epitomizes the globalization of science. Organized by the International Council for Science (ICSU) and the World Meteorological Organization, over 60 nations will contribute thousands of scientists to it to work together on over 200 projects. According to the organizers, “The fundamental concept of the IPY 2007–2008 is of an intensive burst of internationally coordinated, interdisciplinary, scientific research and observations focused on the Earth’s polar regions.” The IPY focuses on new ways to both understand the polar regions and develop enhanced, long-lasting observational facilities and infrastructure. It also aims to recruit a new generation of polar scientists and engineers. The IPY offers the scientific community a superb opportunity to reach out to citizens around the world with the wonders of science and its applicability to crucial issues affecting them and generations to come.

IPY research projects will include mathematical, physical, biological, behavioral, and social scientists and a wide range of engineering researchers. This mix of disciplines makes this polar year initiative unique, because the earlier ones were strictly geophysical. This IPY specifically includes research directed at the human elements of polar regions “to investigate the cultural, historical, and social processes that shape the sustainability of circumpolar human societies.” Its multidisciplinary character underscores how much society depends on the full array of sciences—mathematics; the physical, life, and social sciences; and engineering—to fully understand the natural world, how to preserve it, and how to make sure humans will continue to have a secure, productive, and fulfilling place in it.

Reaping the benefits of this grand IPY initiative is not only up to the global scientific community. It also will depend on the wisdom of policymakers around the world to provide enough resources to ensure its success. The recent budget frenzies in the United States came dangerously close to compromising, or at least substantially delaying, this country’s participation. We all need to be vigilant and make certain that the great opportunities inherent in the IPY are not forsaken.

– Alan I. Leshner

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