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## **The International Space Weather Initiative (ISWI) Report for the IAU**

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International Heliophysical Year (IHY) 2007 was an international program of scientific collaboration involving thousands of scientists from more than 70 countries, which ended in February 2009. Along with programs devoted to research, outreach and the commemoration of International Geophysical Year 1957, activities of the IHY included the deployment of new instrument arrays, especially in developing countries, and an extensive education and public outreach component.

It was recognized early in the planning of IHY that the understanding of the global ionosphere and its linkage to the near-Earth space environment was limited by the lack of observations in key geographical areas. To address this need, a series of workshops was held to facilitate collaboration between research scientists in scientifically interesting geographic locations and researchers in countries with expertise in building scientific instrumentation. Science teams were put together, each led by a scientist who provided the instruments or fabrication plans for instruments in the array. Support for local scientists, facilities and data acquisition was provided by the host nation. As a result of the IHY program, scientists from many countries now participate in instrument operation, data collection and

analysis, and publication of scientific results, working at the forefront of scientific research.

The instrument deployment program was one of the major successes of the IHY. Arrays of small instruments such as magnetometers to measure the Earth's magnetic field, radio antennas to observe solar coronal mass ejections, GPS receivers, very low frequency radio receivers, all-sky cameras to observe the ionosphere, and muon detectors to observe energetic particles were installed around the world. These arrays continue to provide global measurements of heliospheric phenomena. An interesting side benefit of the instrument program was the seeding of new heliophysics research groups in universities, and the strengthening of existing research groups where new instruments were installed.

Building on this concept, and to continue coordinated heliophysics research, in February 2009, the International Space Weather Initiative (ISWI) was proposed as a new agenda item for the Scientific and Technical Subcommittee of the United Nations' Committee on the Peaceful Uses of Outer Space. The agenda item was endorsed by the Committee in June 2009 and by the UN General Assembly in December 2009, and involves a 3-year work plan through 2012. Through the ISWI, coordinated international research is continuing on universal processes in the solar system that affect the interplanetary and terrestrial environments, and there will be continued coordination on the deployment and operation of new and existing instrument arrays. The main focus of ISWI is aimed at understanding and predicting the impacts of space weather on the Earth and the near-Earth environment. Participation in the ISWI is open to scientists from all countries as either instrument hosts or instrument providers.

The ISWI Secretariat is directed by Joseph Davila and Nat Gopalswamy of the U.S. and Hans Haubold of the UN Office for Outer Space Affairs in Vienna. It is governed by a Steering Committee of 16 members, which meets once a year to assess progress and provide prioritization for the upcoming year. There are currently National Coordinators from 81 countries that help coordinate ISWI activities in each country. Details and information archives for ISWI are at: <http://www.iswi-secretariat.org/>. Within the IAU, coordination of ISWI activities is within the Solar and Heliosphere Division (II). ISWI activities are coordinated in the Division II working group on International Collaboration on Space Weather chaired by David Webb. He also was the IAU representative to the IHY and is currently the representative for the ISWI.

The objectives of the ISWI are to help to develop the scientific insight necessary to understand the physical relationships inherent in space weather, to reconstruct and forecast near-Earth space weather and to communicate this knowledge to scientists and to the general public. This will be accomplished by (a) continuing to deploy new instrumentation, (b) developing data analysis processes, (c) developing predictive models using ISWI data from the instrument arrays to improve scientific knowledge and to enable future space weather prediction services and (d) continuing to promote knowledge of heliophysics through education and public outreach.

ISWI currently has 14 instrument arrays in deployment or under development. These are located in many countries and coordinated by scientists from the United States, France, Africa, Switzerland, Japan and Armenia. The first international ISWI workshop will be held in Helwan, Egypt, November 6-10, 2010 and is for the Western Asia region. The 2009 UN/ESA/NASA/JAXA Workshop on Basic Space Science and the International Heliophysical Year 2007, held in the Republic of Korea in 2009, started implementing ISWI as put forth by UNCOPUOS.

During the IHY, space science schools in Brazil, China, India, Nigeria and the United States provided related training to hundreds of graduate students and new researchers. The ISWI is continuing to provide support for space science schools and to promote space science and the inclusion of space science curricula in universities and graduate schools. The ISWI also supports public outreach projects. It is essential to communicate the excitement and the relevance of heliophysical research to scientists from other disciplines, and to the public at large. Through the Initiative, public outreach materials unique to the Initiative will continue to be developed, and their distribution will be coordinated through individual contacts and outreach workshops.