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差出人　George Maeda

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* I S W I = International Space Weather Initiative *
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* Publisher: Professor K. Yumoto, ICSWSE, Kyushu University, Japan *
* Editor-in-Chief: Mr. George Maeda, ICSWSE (maeda[at]serc.kyushu-u.ac.jp)*
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Attachment(s):
(1) "2012SW000874", 381 KB pdf, 3 pages.
(2) "IHY2007UNBSSI", 32 KB pdf, 2 pages.

: Re:
: Societal Impacts of Space Weather, etc.
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Dear ISWI Participant:

I was away to attend "AGU Chapman Conference Ethiopia" and to install a magnetometer near Durban, South Africa. Tomorrow I leave for "AGU Fall Meeting" in San Francisco. After that, I will catch up on my email; please bear with me.

Incidentally, I want to congratulate the new officers of "African Geospace Society". They were all elected during the aforementioned Chapman Conference in Addis Ababa. This society will produce a formal announcement ... which naturally will be circulated by this newsletter ... so stay tuned to this channel.

The item for today:

The UN Office for Outer Space Affairs has asked me to circulate the two attached documents. They are:

(1)
"Space Weather Societal Impacts Workshop and Seminar at the 55th Meeting of the United Nations Committee on the Peaceful Uses of Outer Space"

(2)
: << Putting the “I “ in I*Y 2007 >>
:
The following text is contained in UN Document A/AC.105/823: Report of the Scientific and Technical Subcommittee (of UN COPUOS) on its forty first session, held in Vienna from 16 to 27 February 2004, pages 27-29 (paras 151-158).
: (see the pdf for the rest).

The first document is a write-up on the workshop that was held

earlier this year during the UN COPUOS gathering in Vienna
-- please refer to previous issues of this newsletter.

Sincerely,
: George Maeda
: The Editor
: ISWI Newsletter

Space Weather Societal Impacts Workshop and Seminar at the 55th Meeting of the United Nations Committee on the Peaceful Uses of Outer Space

James Head and Hans Haubold

Published: 28 November 2012

Citation: Head, J., and H. Haubold (2012), Space Weather Societal Impacts Workshop and Seminar at the 55th Meeting of the United Nations Committee on the Peaceful Uses of Outer Space, *Space Weather, 10*, S11007, doi.10.1029/2012SW000868.

The United States organized and convened a workshop on Space Weather Societal Impacts, held on the margins of the 55th Meeting of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), in Vienna on 8 June 2012. The purpose of this workshop was to focus the attention of space weather experts and member state representatives in the United Nations on the societal impacts of space weather events, with particular attention to the needs of developing nations. Approximately 20 science and policy experts representing more than 10 nations participated in the workshop. In focusing on societal impacts, the workshop helped the U.N. Office for Outer Space Affairs meet the mandate set forth by the member states in the COPUOS agenda item on the International Space Weather Initiative (ISWI). ISWI has enjoyed a great deal of success in implementing research observatories globally but has had less success in articulating the potential societal implications of space weather events. This first workshop on Space Weather Societal Impacts addresses the gap in international appreciation for the hazards attendant in solar activity at the governmental level of member States of the United Nations. The workshop was organized around several themes.

Space Weather Phenomena

A tutorial on the broad range of phenomena and the relevant physics of space weather was presented. Space weather was broken into three types of phenomena: solar flares, coronal mass ejections, and the solar wind, covering electromagnetic radiation, energetic charged particles, and magnetized plasma. The discussion continued with the physical mechanisms by which these phenomena interact with the Earth as a geophysical system and how these interactions might interfere with communications, satellites, and the electric grid. The Sun-Earth transport times, and hence possible warning times, were also conveyed. It was noted that civilization has inadvertently but markedly increased its vulnerability to solar events over the past several decades through greater reliance upon vulnerable systems; previously unnoticed events can now have a devastating impact. Today, it is clear that developing as well as developed countries are vulnerable.

Impacts

The workshop focused on several specific impacts on technological systems. Solar events can disrupt high-frequency communications both through UV radiation and charged particles interacting with the ionosphere. Affected human activities include aviation, humanitarian aid, and emergency response. It was noted that the 8 March 2011 solar storm disrupted communications over most of the continent of Africa (Figure 1).

Loss of satellite links can have ramifications for developing as well as developed countries. For example, Burkina Faso relies upon donated transponder time from a commercial communications satellite for telemedicine. Loss of that or even another satellite would make these medical services unavailable since in times of crisis the global satellite telecommunications industry places priority on restoring services to paying customers.

Regarding the electric grid, high-voltage transformers are particularly vulnerable to geomagnetic storms and can take years to replace. The workshop discussed transformer failures in Canada, the United States, and South Africa as well as recent research results indicating a greater vulnerability to electric grid failure than had been previously believed for countries near the geomagnetic equator.

International Efforts

The workshop discussed international efforts already underway to address space weather hazards. The U.N. COPUOS

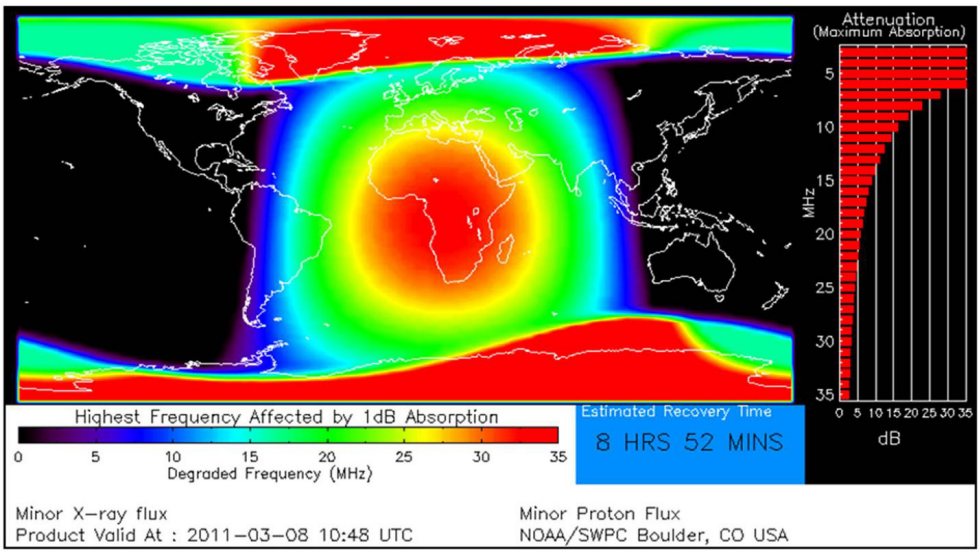

Figure 1. Map of ionospheric disturbance resulting from a solar storm on 8 March 2011 at 10:48 UT. Energetic photons have disrupted the ionosphere over the continent of Africa, interfering with HF communications. Charged particles from the same event have arrived in the polar regions, disrupting communications there as well. Map is provided courtesy of the Space Weather Prediction Center, NOAA, in Boulder, Colo.

has launched a Working Group on Long-term Sustainability of Space Activities, which includes an expert group focused on space weather. This expert group will deliver a report and a set of recommended guidelines to the working group by 2014. The guidelines could be adopted on a voluntary basis to allow states to take actions to protect their populations. The World Meteorological Organization (WMO) has launched an Inter-programme Coordination Team for Space Weather. The team has helped the WMO launch a Web-based space weather product portal (http://www.wmo.int/pages/prog/sat/spaceweather-productportal_en.php). This Web site provides a single point of entry for users to access space weather operational products from around the world. The WMO welcomes all users to explore the portal and provide feedback. Space weather organizations are encouraged to participate.

ISWI, a 3 year agenda item of the Science and Technical Subcommittee (STSC) of the COPUOS, will conclude its activities in 2012. ISWI brokers mutually beneficial relationships between instrument providers and instrument hosts. Many crucial areas of the globe are not well instrumented, and many developing nations are ideally located to fill these critical gaps. ISWI is largely a research program: most of the instruments and host institutions do not provide data in an operational manner. This is an area of consideration as ISWI continues to grow and evolve, possibly under the new agenda item on space weather in the STSC. The workshop also learned about the recently formed Asia-Oceania Space Weather Alliance, which held its first conference in 2012.

Summary and Actions

The workshop participants agreed that the societal impacts of space weather are potentially severe and could be more broadly felt than is commonly recognized. In addition, the participants agreed that the burden of providing assets and services requires more global coverage and funding than can be borne by any one nation; international cooperation is required to provide adequate mitigation of this hazard.

The participants assigned two actions: First, the workshop will convene via e-mail to craft and discuss a document that provides a framing vision for the global space weather enterprise. Second, the participants will provide a description of space weather impacts, clearly articulating the consequences of space weather activity for infrastructure in developed and developing countries. These descriptions are meant to help communicate to all nations the risks presented by solar activity and to encourage a global response to meet this challenge.

On the following business day, a seminar on space weather followed the morning plenary session of the COPUOS, with simultaneous translation into the six official languages of the U.N. The seminar highlighted the key aspects of the workshop and was well received. Many delegations requested the presentation materials, which have been placed on the ISWI Web site (http://www.iswi-secretariat.org/).

Assuming that the workshop participants make good progress with their action items, we anticipate a follow-on workshop in 2013. In the meantime, the results of the workshop were conveyed to two U.N. activities on space weather that were held in Graz, Austria (http://www.unoosa.org/oosa/en/SAP/act2012/graz/index.html), and in Quito, Ecuador (http://iswiecuador.epn.edu.ec/), for further consideration.

Acknowledgments.

The conveners recognize the thoughtful and energetic logistical support for this workshop from the U.N. Office for Outer Space Affairs. We also thank the participants, in particular the speakers, for their efforts in support of this work-

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shop. Finally, we thank Madhulika Guhathakurta, NASA Headquarters, for suggesting this workshop.

James Head *was an AAAS Science and Technology Policy Fellow at the Office of Space and Advanced Technology, U.S. State Department in Washington, D. C. He has since returned to the private sector in Tucson, Ariz. Email: jnhead2001@yahoo.com.*

Hans Haubold *(retired) was with the United Nations Office for Outer Space Affairs, in Vienna, Austria.*

Putting the "I " in I*Y 2007

The following text is contained in UN Document A/AC.105/823: Report of the Scientific and Technical Subcommittee (of UN COPUOS) on its forty-first session, held in Vienna from 16 to 27 February 2004, pages 27-29 (paras 151-158).

In accordance with General Assembly resolution 58/89, the Scientific and Technical Subcommittee considered agenda item 13, "Solar-terrestrial physics", as a single issue/item for discussion.

1. The representatives of Canada, China, Cuba, France, India, Japan and the United States made statements under the item.

2. The Subcommittee heard the following scientific and technical presentations on the subject of solar-terrestrial physics:

(a) "The Sun-Earth plasma environment", by the representative of Austria;

(b) "CORONAS-F: contribution to solar-terrestrial physics", by the representative of the Russian Federation;

(c) "The scientific importance and socio-economic efficiency of the implementation of programmes on solar-terrestrial physics", by the representative of the Russian Federation;

(d) "International Living with a Star (ILWS)", by the representative of the United States;

(e) "European view on International Living with a Star", by the representative of ESA;

(f) "Report of the Task Force on Radio Astronomy and the Radio Spectrum", by the representative of the Organisation for Economic Cooperation and Development.

3. The Subcommittee agreed that solar-terrestrial physics was important in exploring the **solar corona** and understanding the **functioning of the Sun**; understanding the effects that the **variability in the Sun** can have on the **Earth's magnetosphere, environment and climate**; exploring the **ionized environments of planets**; and reaching the limits of the **heliosphere and understanding its interaction with interstellar space**. The Subcommittee also agreed that, as society became increasingly dependent on space-based systems, it was vital to understand how **space weather, caused by solar variability, could affect,** among other things, **space systems and human space flight, electric power transmission, high-frequency radio communications, global navigation satellite system (GNSS) signals and long-range radar, as well as the well-being of passengers in high altitude aircraft.**

4. The Subcommittee noted that severe magnetic storms resulting from coronal mass ejections had caused failures of many geostationary orbit communication satellites, radio blackouts and power outages on Earth. The Subcommittee agreed that the ability to predict space weather accurately could assist in preventing or minimizing impacts of severe magnetic storms on space-based services and systems and on ground power systems.

5. The Subcommittee noted that several **scientific missions had been undertaken** by space agencies to study the interactions between the Sun and the Earth. These included the Cluster mission, the Double Star mission, the Enhanced Polar Outflow Probe (ePOP), the Solar and Heliospheric Observatory (SOHO) and the Yohkoh mission.

6. The Subcommittee agreed that international cooperation in research and development activities in the field of solar-terrestrial physics was important to all countries, in particular developing countries, owing to the high cost of such activities.

7. The Subcommittee noted that the International Living with a Star (ILWS) initiative was a collaborative programme in solar-terrestrial physics that had been undertaken to stimulate, strengthen and coordinate space research to understand the governing processes of the connected Sun-Earth system as an integrated entity. ILWS consisted of an international fleet of more than a dozen international space missions acquiring data on the behaviour of that system by observing the Sun and its variability and measuring conditions in interplanetary space. The Subcommittee also noted that **new space missions were under development** to contribute to ILWS in the coming decade. These included the CORONAS-PHOTON project, the Picard micro-satellite mission, the Solar-B satellite and the Solar Probe, among others.