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Communicating Space Weather to the Public

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During the 95th American Meteorological Society (AMS) Annual Meeting in Phoenix, Arizona, the Space Weather Conference convened a special session on improving communication related to space weather events and impacts. Space weather sounds frightening to the public; thus, it can be a communication challenge for space weather enthusiasts and professionals in the field [e.g., *Vanlommel et al.*, 2014]. Casual use of words such as “coronal mass ejections-CMEs” and “geomagnetic storms” could unnecessarily alarm the public.

This session focused on how the space weather community can improve its communication to the public and dispel some common misunderstandings of storms from the Sun and in space. The session brought together representatives from the media, government, private sector, and academia, encompassing a broad range of knowledge and opinions to discuss how to improve messaging to the public about space weather.

One panelist, Jay Trobec, Chief Meteorologist at KELO-TV, addressed challenges broadcast meteorologists face in communicating space weather to the public. According to Jay it is difficult for media to find useful, applicable information. Jay noted that “commercial vendors provide broadcasters with professional graphics systems that turn raw weather data into broadcast-ready graphics.” Data from many sources are automatically displayed on a station’s graphics system, providing images with a consistent “look”—colors, maps, logos, etc. For space weather, the quality of screen-grab graphics off of the internet is not nearly as good or attractive as that provided by these professional graphics systems. A second issue is having the broadcast meteorologists understand the information provided to them. In most cases, meteorologists have a physical science education that likely does not include space physics.

Jason Samenow from the Washington Post Weather Gang provided insight on best practices on communicating space weather to the public through articles and stories. Jason noted that stories with compelling imagery attract the public but also cautioned that most images or videos of solar eruptions carry insufficient information to help the public understand the science behind them and the likelihood of them affecting Earth. This is a risk given the possible consequences of low-probability and high-impact events. Using images of solar flares or CMEs has a “wow” factor, but Jason warned that we need to give a sense of balance related to events that could have big impacts but low probabilities of occurrence. Another major issue is the complexity behind space weather. Translating space weather science into plain English is a formidable task. Most space weather websites are hard for the average person to navigate and understand. Jason also noted that “most space weather events are benign while terms like X-class flare and coronal mass ejections could scare the public.” Unlike terrestrial weather forecasts, most people do not understand space weather forecasts when they are issued.

Dr. Richard Clark from Millersville University provided a perspective on space weather education. He asked how colleges and universities are addressing space weather and heliophysics at the undergraduate and graduate levels. Less than 10 U.S. colleges or universities offer a degree or minor in space weather or solar physics. At the graduate level, ~25 schools offer a space weather or solar physics program. He suggested that space weather be introduced at the high school level and continued at the undergraduate level for science students. Dr. Clark stressed the need for more readily available resources such as the University Corporation for Atmospheric Research Centre for the Observation and Modelling of Earthquakes and Tectonics modules for meteorologists so they could better deliver a coherent, scientific message to the public. He also pointed out that science writing/communication classes rarely teach students how to communicate space weather. This is something that the space weather community needs to stress and push for.

The panel discussion moderator, Tom Champoux, remarked that space weather seems to only have two states: on and off. That is either space weather is quiet or there is a rare, spectacular event in progress. Because space weather is highly intangible, the public is unaware of daily space weather. It seems that there is more discussion of the “potential” of an event as the primary story than the results of an event.

When the public thinks of space weather they immediately think aurora borealis, which does not illustrate the entire story of space weather and associated science. Terrestrial weather occurs just outside the public's front door. Most people are familiar with storms that develop and are tracked in a typical 3–5 day timeframe. However, public understanding can be challenged by space storms that originate 1.5×10^{11} m (93 million miles) away, are difficult to track, and can have effects that range from immediate to lagged by hours and days. Our challenge is to find ways to effectively and accurately communicate about various aspects of space weather outside of impending events (CMEs, etc.).

Jacob Wycoff, a broadcast meteorologist for WeatherBug, asked “How do we cut through the noise of social media to deliver informative space weather?” There is a sense from the general public of “Who cares about what is going on in space, I want to know if it is going to rain tomorrow, or will we get hit with that snowstorm?” Wycoff said, “Looking at how the media blew the term “polar vortex” out of proportion, how do we make space weather interesting without scaring or overhyping the general public?”

Participants suggested ideas for improving space weather communication. For example, a few students from Millersville University suggested online videos recapping weekly space weather events, similar to online video forecasts provided by AccuWeather and The Weather Channel.

The AMS continues to advance space weather in society and has adopted a space weather policy statement that can be found at https://www.ametsoc.org/policy/2013spaceweather_amsstatement.html. Going forward there is a need to improve space weather education and outreach for the public. Giving presentations on “What is space weather, what are the effects, why should we care, what can we do, etc.” and focusing on straightforward language are two target areas for space weather presenters. The annual Space Weather Conference, now celebrating 11 years at AMS, is an important means of integrating space weather into the meteorological world and the mind of the public.

References

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