

Space Weather through a solar cycle

The American Geophysical Union (AGU) initiated *Space Weather* about one solar cycle ago. While the AGU had long been a learned professional society whose research had important applications of societal benefit, the Union had never before published a professional journal that was devoted solely to applications of any of the research conveyed at its professional meetings and in its published research papers. Even prior to the space age, in the last decade of the nineteenth century, the predecessor to the *Journal of Geophysical Research, Terrestrial Magnetism and Atmospheric Electricity*, published research articles that contained information on natural phenomena that could impact some of the technical systems of the time. For example, research related to Earth conductivity is quite relevant to geomagnetically-induced Earth (“telluric”) currents in conductors such as formed the basis of communications by telegraph.

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1002/2014SW001036

Under the encouragement and leadership of the early pioneers of the space age, the AGU became the dominant professional society for the advancement of learning of the Sun and its influences on Earth (and of the solar system). The last half of the twentieth century also saw a vast proliferation of technologies, in space and on Earth's surface, that could be impacted by solar-terrestrial processes. Dr. Robert Robinson wrote in the first issue of *Space Weather* that the objective of the AGU in initiating the journal was to "promote communication among scientists, engineers, technicians, science administrators, and space weather policy makers in a way that leads to continuous improvement in the nation's ability to mitigate space environment hazards to technical systems on the ground and in space." (<http://onlinelibrary.wiley.com/doi/10.1029/2003SW000019/abstract>).

As founding editor, I wrote in an editorial accompanying Robinson's that "*Space Weather's* time has come", and that it was hoped that *Space Weather* would become "highly valued not only by the research community working in the field but also by the design and operations engineers and scientists who everyday face space weather challenges to their systems." (<http://onlinelibrary.wiley.com/doi/10.1029/2003SW000024/abstract>).

Space Weather was also revolutionary for AGU publications in that it not only carried peer reviewed technical articles on applications of space-related research, but it also published non-technical Feature Articles, commentary, opinions, and editorials, all devoted to the applications of frontier knowledge. The hard copy digest *Space Weather Quarterly* has seen wide circulation among policy, management, and technical leaders in government and industry.

From the decline of solar cycle 23 and into and beyond the maximum of cycle 24, *Space Weather* has published applications that have included solar particle events and aircraft routing, damage to electrical components flown on Earth-orbiting and planetary spacecraft, and the induction of ground currents in long conductors such as electrical grids, pipelines, and undersea communication cables. The effects of solar radio bursts and of solar X-Ray and UV emissions on radio signals and on equipment such as GPS receivers have been covered. Discussions of how to forecast potentially deleterious solar-terrestrial effects have been addressed by empirical and analytical modeling papers. The journal has encouraged such modeling papers, even when models are not perfect, so that others can test models and learn from them in order to speed the attainment of better forecasting and prediction.

It has been an exciting solar cycle at *Space Weather*. The journal's staff and editorial advisory board look forward to continuing and enhancing the journal for the benefit of the engineers, designers, forecasters, system operators, modelers, and researchers who publish in it and who use published knowledge for its application to the very practical concerns and needs of private and governmental companies and agencies.

Louis J. Lanzerotti is Editor of *Space Weather* and a distinguished research professor of physics at the New Jersey Institute of Technology in Newark. He is retired from Lucent Technologies Bell Laboratories. Email: ljl@njit.edu.