

Forum

Solar-Terrestrial Physics Revisited

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The cover and feature article ["The CSSP Implementation Plan for Space Plasma Physics Programs"] of the December 10, 1985, issue of *Eos* continue a *misleading* impression of basic research in solar-terrestrial physics [STP]: all important solar-terrestrial research is based on observations made from space. While I praise authors D. N. Baker and D. J. Williams for their excellent promotion of the STP field, they make the myopic mistake of implying that the NASA [National Aeronautics and Space Administration]-supported research is equivalent to the complete U.S. program in STP research. The editors of *Eos* are imputed in this mistake by placing an attractive figure on the cover that omitted the essential word "NASA" in the title.

It is essential to include the area of solar physics in the regime of solar-terrestrial research, and this discipline must combine extensive ground-based observations of the sun with those obtained by spacecraft. The NASA programs, as well as any other STP research program, risk failure (or at least an incomplete solution) if they do not integrate with the ground-based solar studies. The ground-based observing studies that accumulate solar data are not included in the "Research and Analysis + S. T. Theory" portion of the NASA budget, except as minor supporting contracts for a very few facilities. The growing crisis in ground-based solar synoptic programs, underscored by the closure of major facilities in recent years, is worsened by insensitive viewpoints of space scientists.

Interest and responsibility for STP research is shared by government agencies besides NASA. It is unfortunate that funding difficulties have interfered with intentions by NOAA [National Oceanic and Atmospheric Administration] and other agencies to support STP research. Complete and comprehensive records of solar activity are needed over several 11-yr solar cycles for an understanding of the nature of those cycles. The provision of solar-terrestrial prediction services requires at least the statistical algorithms that build on a long record of solar activity, and it is preferable to have physical models that come only from an integrated research program that includes space physics and "old-fashioned" physics that is studied without regard to the source of the observations.

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Committee on Solar-Terrestrial Research

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The National Academy of Sciences (NAS)/National Research Council (NRC)

Committee on Solar-Terrestrial Research (CSTR) of the Board of Atmospheric Sciences and Climate is charged with looking after the "health of solar-terrestrial research" in the United States. CSTR was established in 1965 for the purposes of

- responding to requests from government agencies for scientific advice on projects or programs in solar-terrestrial research,
- providing a mechanism for organizing cooperative projects among U.S. scientists,
- taking initiatives in scientific planning as needed, and
- coordinating U.S. researches with those in other countries.

CSTR is also the U.S. national committee for the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP).

Two CSTR studies, "Solar-Terrestrial Research in the 1980s" (1981, H. Friedman and D. S. Intriligator, cochairmen) and "National Solar-Terrestrial Research Program" (1984, D. S. Intriligator, chairman), constitute a set and prescribe a broad-gauged solar-terrestrial program. This program will enable us to increase significantly our understanding of the key physical mechanisms coupling the solar-terrestrial system. Solar-terrestrial research is the study of the essential processes by which energy in all forms is generated by the sun, is transported to earth, and ultimately, vitally influences the terrestrial environment. The principal science issue today is to understand this coupled system.

The "National Solar-Terrestrial Research Program" balances major space-based observational efforts with a vigorous program of theory, data analysis, and ground-based and suborbital research to maximize the results from the whole program. The report also recommends formal interagency coordination among the federal agencies involved in the implementation and conduct of the national program (e.g., the National Science Foundation, National Oceanic and Atmospheric Administration, National Aeronautics and Space Administration, Department of Defense).

In response to these considerations and to the NRC report, in 1984 the President's science advisor, George A. Keyworth II, established an Interagency Coordinating Committee on Solar-Terrestrial Research (ICCSTR) to act as a coordinator, clearinghouse, and evaluator of federal research efforts on designated solar-terrestrial research projects. Richard Johnson of the Office of Science, Technology, and Policy (OSTP) chairs the ICCSTR.

The CSTR works with individual scientists, federal agencies, ICCSTR, other NAS/NRC boards and committees, and SCOSTEP and other international agencies to maximize our scientific knowledge in solar-terrestrial research. As mentioned in Dan Baker's letter, at the request of federal agencies and the scientific community, CSTR has recently formed a panel on long-term observations that will be con-

cerned with all types of data (ground-based, space-based, etc.). AGU sponsored a session on solar-terrestrial research at the 1984 Spring Meeting in Baltimore, Md. Representatives from the NAS/NRC committees, federal agencies, and OSTP made presentations to an audience that was so large that there was standing room only.

The NRC reports reflect the consensus of the community. They show that solar-terrestrial research has now reached a critical point, where a major step forward is possible. I believe that we must all work together and take this opportunity to advance the field of solar-terrestrial research.

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Reply

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It should be emphasized here again—as was mentioned several times in our December 10 article—that the Committee on Solar and Space Physics [CSSP] is an advisory committee of the NAS [National Academy of Sciences]/Space Sciences Board dealing with NASA matters. The CSSP has no authority or purview to deal with the NSF [National Science Foundation] or NOAA or DOD [Department of Defense] research matters. Hence the viewpoints that we took and any myopia evident in our article comes largely from the restrictive territory given to CSSP for its attention and oversight. P. S. McIntosh and all other *Eos* readers should be reminded that solar-terrestrial research, particularly that done from ground-based and non-NASA sources, is the purview of the NAS/NRC [National Research Council] Committee on Solar-Terrestrial Research (CSTR). The CSTR has issued an excellent report entitled "Solar-Terrestrial Research for the 1980s," which makes strong recommendations concerning solar observations and ground-based facilities.

As solar-terrestrial research scientists who work closely not only with NASA but also with the U.S. Department of Energy [DOE] and many components of the DOD, we must take exception to McIntosh's more wide-ranging comments. We fully recognize the need for and importance of observational programs sponsored by the DOE, DOD, NSF, NOAA, and by many other organizations, both foreign and domestic. Our own research regularly relies on measurements of the sun, the magnetosphere, and the ionosphere made from ground stations, and thus we have a strong appreciation for the fundamental role of such observatories. In fact, the Panel on Long-Term Observations (NAS/NRC), chaired by G. L. Siscoe (University of California, Los Angeles), which has one of us (D. N. Baker) as a member, has as one of its main objectives the preservation of installations returning the kind of data discussed by McIntosh (e.g., long-term synoptic solar data sets).