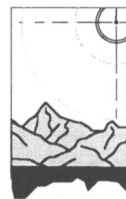


The Sun as a Variable Star: Solar and Stellar Irradiance Variations

*Statement from the Scientific Organizing Committee
Colloquium No. 143 of the International Astronomical Union*



It is now established that the terrestrial climate, radiative environment, and upper atmospheric chemistry are strongly influenced by the varying luminosity of the Sun. The human consequences are such that quantitative study over the solar magnetic cycle is imperative for societal planning. The solar variability together with the accumulation of anthropogenic pollutants determine the human milieu of the future. We note that the World Climate Research Program has expounded a full scientific study of these problems.

The scientific presentations at the IAU Colloquium No. 143 make it clear that the forthcoming termination of essential scientific measurements of solar irradiance places these studies in serious jeopardy. One of the most important aspects of the study is the long-term variation of the Sun, which we have enough reason to believe to be significant. However, the present understanding of the basic physical mechanisms of irradiance variations does not allow us to develop adequate irradiance models. Moreover, the limitations on absolute calibration of instruments, the large short-term variability of the Sun, and the inadequacy of theory conspire to make it impossible to establish long-term trends if there are gaps in the observations. Therefore we request the IAU to draw the attention of the major national space agencies named below to these concerns. The problems we have noted can be addressed by implementing the following specific recommendations:

- *NASA*

(1) High precision observations of solar total and spectral irradiance from UARS and ATLAS are required for one full solar 11-year cycle to achieve progress in understanding key issues of climate change and ozone variation.

(2) Future flight opportunities on EOS for continuous monitoring of the solar radiative outputs urgently need to be maintained, to study the longer-term trends of potential importance to global change. Failure to achieve overlapping continuous measurement sets from successive satellites will reduce the usefulness of the excellent data already obtained (since 1980) addressing these issues.

- *ESA*

Considering the results obtained from measurements of solar total and spectral irradiance of the Sun from the ultraviolet to the infrared, a second flight of EURECA would provide a unique opportunity to extend the measurements carried out by UARS and EURECA-1, to fill the gaps before and after the launch of SOHO. This proposal is in line with the general objectives of the European Community with respect to the Global Change Program.

- *ISAS and NASDA*

The contribution of *Yohkoh* to studies of solar global properties are recognized, and the participants of IAU Colloquium No. 143 recommend and encourage continued analysis of *Yohkoh* data, and of the development of future Japanese solar and applications satellites that can extend our research knowledge in these important directions.



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