Preface

The mission of the International Living with a Star (ILWS) program is to stimulate, strengthen, and coordinate space research to understand the governing processes of the connected Sun-Earth System as an integrated entity. Accomplishing this mission involves: (i) study of the Sun-Earth connected system and the effects which influence life and society, (ii) collaboration among potential partners in solar-terrestrial space missions, (iii) synergistic coordination of international research in solar-terrestrial studies, including all relevant data sources as well as theory and modeling, and (iv) effective and user-driven access to all data, results, and value-added products.

The ILWS program can be thought of as the culmination of various international collaborative efforts starting from the Apollo-Soyuz joint project undertaken in 1975 between the United States and the former Soviet Union. Some recent international collaborative missions such as Ulysses, Yohkoh, SOHO, ACE, Hinode, and STEREO have demonstrated the benefits of collaboration for the world scientific community. Currently the ILWS program has over 20 member agencies cooperating in the space missions and science activities. It is expected that between now and the year 2015, more than twenty new science missions of international cooperation will be flown to investigate various domains of importance to ILWS program and the physical processes that link them.

The 2006 ILWS workshop on “Solar Influence on the Heliosphere and Earth's Environment: Recent Progress and Prospects” is an effort to bring the international space weather and ILWS communities together to address the most critical research problems of solar variability and its impact on the human society. This workshop provided an opportunity to review the current status of our understanding of solar influence on the heliospace, identify promising new lines of research, and provide a venue to identify prospective paths for international cooperation. The scientific program of the workshop was inline with all the objectives of the ILWS program.

The workshop deliberations had programmatic sessions, plenary sessions, working group sessions, and poster sessions. The plenary sessions consisted of review papers that highlighted the current issues in understanding the physical processes from the Sun to the edge of the solar system. The working group sessions had more intense discussions on specific topics based on traditional disciplines of solar-terrestrial physics: (1) solar-heliosphere, (2) magnetosphere, and (3) ionosphere-thermosphere-mesosphere. Plenary sessions also included discussions on the cross-disciplinary aspects of issues raised in the working groups. Finally, there was a panel discussion on future collaborations among members of the scientific community from different countries.

The papers collected in this volume represent a subset of papers presented in the workshop that serve as a record of the workshop proceedings. The review papers will be useful to researchers on solar-terrestrial physics to gain a quick update of the current issues. The contributed papers present original research work. Summaries of the three working group sessions are also included in the front material to serve as introduction to the papers included in this volume. Also included is a summary of the panel discussion on future collaborations.

Papers dealing with all aspects of solar and heliospheric physics are represented: helioseismology, solar atmosphere, solar eruptions (coronal mass ejections and flares), solar irradiance, solar wind, and heliospheric impact. Papers on theory, modeling, and future space missions are also included. Papers in the section devoted to the magnetosphere cover a range of topics including solar wind coupling to the magnetosphere, radiation belts and energetic particles, waves and fluctuations and their effects, storm-substorm relationship, modeling and prediction, and new missions. In the section dealing with ionosphere,

thermosphere, and mesosphere, the papers discuss a number of issues related to effects of solar variability on this region of geospace, observed using satellite and ground-based data including ground magnetometer observations, radio beacon studies of equatorial spread F, and modeling of some of these effects. Radar observations of the mesosphere-lower thermosphere region and a future mission to study the coupling of thunderstorm processes to this region, the ionosphere, and magnetosphere, are also described.

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