

## Preface

The Yosemite workshop on ‘global aspects of magnetosphere–ionosphere coupling’ was held in the beautiful Yosemite National Park (California) from 7 to 10 February 2006.

The topic of the workshop remains an exciting and a timely one. In recent years, our community has had access to an unprecedented wealth of data from many simultaneously operating spacecraft and ground-based observatories, providing both in situ and remote-sensing measurements. Enabled by this data abundance, models of the magnetosphere–ionosphere–thermosphere (M–I–T) system have reached a sophistication that is sufficient to tackle some of the most stubborn outstanding questions in our field. In turn, these models provide a framework for the observations, helping us understand them and their place in the larger system.

The combination of observations and models has fostered an ever-growing awareness of ‘systems-level’ space physics, that is, the global attributes and behavior of the various plasmas and gases of geospace. The response to energy input from the Sun and solar wind involves mass, momentum, and energy exchange among the magnetosphere, ionosphere, and thermosphere. Because of this complex interplay, proper understanding of the global behavior of one part of the system usually requires knowledge of the other parts of the system.

Starting with the very first workshop in 1974 and continuing to the present day, the Yosemite meeting traditionally has promoted an interdisciplinary approach to the study of geospace. Upholding this tradition and also in support of a systems-level perspective of the M–I–T system, the 2006 Yosemite workshop encouraged participation by scientists from a broad range of disciplines. Also consistent with tradition, attendance was limited to just over 70 people to embolden informal discussion and

debate. The resulting workshop was a remarkable success.

A special Yosemite issue of JASTP was suggested by editor-in-chief Dr. William Lotko, with the goal of motivating and advocating systems-level science as a facilitator of future progress in our field. The 18 papers in this special issue are a representative subset of the meeting presentations, and touch upon the major global aspects of the M–I–T system. Echoing the meeting format, tutorial review papers are complemented by more focused treatments of particular aspects of the M–I–T system that play a crucial role in the systems-level behavior.

The order of papers in this issue is designed to take the reader on a journey through and beyond geospace. We begin with a global look at the system (Lotko), followed by a multi-faceted examination of how that system responds to forcing by the solar wind and interplanetary magnetic field (Perroomian et al., Murr and Hughes, Shepherd, Ostgaard et al., Pulkkinen et al., Moore et al., Burke et al.). A tutorial of the electrodynamics of the inner magnetosphere (Wolf et al.) is followed by investigations of the storm-time ionosphere (Foster et al., Yizengaw et al.) and the plasmasphere (Goldstein et al., Larsen et al., Gallagher et al., Carpenter). A tutorial on the radiation belts (Millan and Thorne) complements a focused study of chorus wave acceleration and loss (Bortnik and Thorne). Last but not least, we move outward to Jupiter to look at universal aspects of M–I coupling (Bagenal).

It was wonderful to have participated in the 2006 Yosemite workshop, which left us thrilled about the systems-level approach to studying geospace. To have seen such a diverse group of scientists come together in one place was a privilege, and hopefully portends many similar gatherings to come.

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