

**A proposal for a special issue of the
Journal of Atmospheric and Solar-Terrestrial Physics
as a culmination of the 2006 Yosemite Workshop**

Title of the special Issue:

Global Aspects of Magnetosphere-Ionosphere Coupling

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Purpose of the special issue:

Understanding the global response of the Earth's magnetosphere-ionosphere system to solar driving requires knowledge of the spatial and time-dependent response of the various plasma populations, their coupling and the resultant dynamic feedback on the system. Recent multi-point measurements and imaging from ground and space-based platforms, as well as concurrent progress in global modeling have revealed new features of these global interactions and the physical processes behind them. These advances allow us to tackle some of the most stubborn outstanding questions concerning magnetosphere-ionosphere (M-I) coupling. What are the global attributes and behaviors of the M-I system, and how is this M-I system controlled or influenced by small-scale and cross-scale processes? How much does the ionosphere control the electrodynamics of the magnetosphere, and what are the most important gaps in our knowledge of the magnetospheric electric field? What roles do various wave-particle interactions play in the overall dynamics of magnetospheric plasmas? What have we learned, and how can we use what we know in our mission of discovery to other planetary magnetospheres such as Jupiter and Saturn?

The goal of the 2006 Yosemite Workshop was to examine M-I coupling from a global, systems-level perspective. The workshop was held on February 7-10, 2006 at Yosemite National Park in California with participation from seventy-three scientists. The program was divided into "systems-level" and "focus" talks. The systems level talks examined the big picture, how components of the global system interact with each other. They synthesized past work and new insight from recent analysis. On the other hand, each of the focus talks examined a single phenomenon vital to systems-level M-I coupling.

As such, the JASTP special issue would include review papers as well as new groundbreaking research in the area of M-I coupling from low latitudes to the polar cap. There are 27 papers currently planned for the special issue; see the content list below.

Paper 1 is an introduction to the special issue given by one of the workshop organizers. Papers 2-14 present aspects of coupling between the plasmasphere, ring current, radiation belts and the low- and mid-latitude ionosphere and thermosphere. Papers 15-23 move to higher latitudes focusing on the auroral region and the polar cap. Papers 24-26 examine M-I coupling from a global modeling perspective. Finally, paper 27 explores coupling within the Jovian magnetosphere.

Topics presented at the Yosemite 2006 workshop are highly timely and relevant to the larger space physics community. A special issue of JASTP would provide means of disseminating this work in a well-respected and widely circulated scientific journal.

Content of the special issue:

1. Goldstein, J., Introduction to the special issue: Global aspects of magnetosphere-ionosphere coupling
2. Wolf, R. A., The inner magnetosphere: An evolving picture
3. Sazykin, S., Structure and strength of ionospheric electric fields of magnetospheric origin during large geomagnetic storms
4. Anderson, P. C., Subauroral electric fields: Their characteristics and relationship to Region 2 field-aligned currents
5. Anderson, B. J., Korth, H., Frey, H., Greenwald, R. A., Ruohoniemi, J. M., and Rich, F. J., Aspects of magnetosphere-ionosphere coupling derived from global determinations of Birkeland currents, convection and remote sensing
6. Brandt, P. C., Zheng, Y., Fok, M.-C., Mitchell, D. G., Ukhorskiy, A. Y., and Anderson, B. J., The role of the ring current and conductivity in the inner magnetosphere
7. Foster, J., Rideout, W., Sandel, B., Forrester, W. T., and Rich, F., On the relationship of SAPS to SED
8. Heelis, R., and Coley, Variations in the low and middle latitude topside ionosphere observed by DMSP during superstorm events
9. England, S. L., Immell, T. J., Sagawa, E., Henderson, S. B., Hagan, M. E., Mende, S. B., Frey, H. U., Swenson, C. M., and Paxton, L. J., The effect of atmospheric tides on the morphology of the quiet-time, post-sunset equatorial ionospheric anomaly
10. Spasojevic, M., Goldstein, J., and Richmond, A., The effect of thermospheric winds on plasmaspheric drift patterns
11. Carpenter, D. L., Chung Park, pioneer of M-I coupling research
12. Larsen, B., Klumpar, D., and Gurgiolo, C., Model of plasmapause position and delay times from solar wind parameters
13. Gallagher, D., The analysis of plasmaspheric flow in IMAGE EUV observations
14. Yizengaw, E., Moldwin, M. B., and Dyson, P. L., The potential of ionospheric tomography to image structures in average electron density over a wide spatial region
15. Bortnik, J. and Thorne, R. M., The dual role of ELF/VLF chorus waves in the acceleration and precipitation of radiation belt electrons
16. Millan, R. and Thorne, R., Review of relativistic electron losses from the radiation belts
17. Lotko, W., A systems perspective on MI Coupling

18. Richmond, A. D., Maute, A., Lu, G., Joule heating effects on the upper atmosphere
19. Ostgaard, N., Mende, S. B., Frey, H. U., Sigwarth, J. B., Aasnes, A., and J. Weygand, Auroral conjugacy studies
20. Immel, T., Disturbance Dynamo Effects in the Evening Sector at Low Latitudes
21. Strangeway, R. J., Carlson, C. W., Chaston, C. W., Ergun, R. E., and McFadden, J. P., The auroral acceleration region and global magnetosphere-ionosphere coupling: A FAST perspective
22. Burke, W. J., Surprising aspects of superstorms' main phase
23. Dombeck, J., Wygant, J., Cattell, C., Lysak, R., McFadden, J., Parks, G., Scudder, J., Streltsov, A., Chen, L.-J., Alfvén waves in magnetosphere-ionosphere coupling and their powering of the aurora
24. Mende, S. B., Frey, H. U., Peticolas, L. M., Immel, T. J. and Carlson, C. W., Observations of global and meso scales coupling dynamics by Alfvén Waves from the IMAGE and FAST satellites
25. Parish, H., Understanding neutral structure in the region of the diffuse aurora
26. Murr, D., Hughes, W. J., and Alves, Coupled magnetosphere-ionosphere response to IMF reorientations: A systems-level review
27. Murr, D. and Hughes, W. J., The coherence of high-latitude ionospheric flows and the IMF
28. Semeter, J., Time dependent response of the high-latitude ionospheric conductance: Implications for global magnetospheric dynamics
29. Shepherd, S. G., Polar cap potential saturation: observations, theory, and modeling: A review of the current state of observations
30. Greenwald, R. et al., Spatial and temporal variability of electric fields in the coupled inner magnetosphere-ionosphere system
31. Moore, T., Global aspects of heliosphere-geosphere coupling
32. Pulkkinen, T. I., Two-way coupling of the solar wind-magnetosphere-ionosphere system
33. Peromian, V., A comparison of solar wind and ionospheric plasma contributions to the September 24-25, 1998 magnetic storm
34. Bagenal, F., The magnetosphere of Jupiter: Coupling the equator to the poles
35. Hughes, W. J., The magnetosphere and ionosphere as a system