MULTISCALE STRUCTURE OF THE
DYNAMIC PROCESSES IN
THE CRITICAL MAGNETOSPHERIC
REGIONS

Proceedings of the D3.5 Symposium of COSPAR Scientific Commission D which was held
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Edited by

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Preface

The scientific symposium, "Multiscale Structure of the Dynamic Processes in Critical Magnetospheric Region," was held at the 33rd Scientific Assembly of COSPAR in Warsaw, Poland, 16-23 July 2000. The magnetosphere is a complex coupled system. This coupling is both between regions and between scales. The upstream region couples to the bow shock and the magnetosheath. The bow shock and magnetosheath couple to the magnetopause and hence to the inner magnetosphere. The interplanetary field couples the solar wind to the tail and the magnetospheric field couples the tail to the ionosphere and the upper atmosphere. In each of these regions both the microscopic and macroscopic phenomena are important and affect each other. The beam-plasma instabilities in the foreshock cause the growth of upstream UCF waves that connect back against the magnetosphere and cause standing waves along the magnetosheath field lines. Both on the magnetopause and in the tail, macroscopic processes cause magnetic field lines to change partners and "reconnect." The altered magnetic tension occasioned by this switch in partners produces strong flows that energize the magnetotail in the case of the magnetopause and the nightside magnetosphere and ionosphere in the case of the tail flows. Throughout the system, microscopic processes are affecting the macroscopic and vice versa.

The symposium was designed to examine these processes throughout the critical region of terrestrial and planetary magnetospheres. It consisted of invited and contributed papers over a two-day period. It was organized by L. M. Zeelenyi and R. Treumann, who in turn invited us to act as editors of the proceedings. The talks have been grouped according to magnetospheric region in deference to the increasing specialization of magnetospheric physicists. The first set of papers covers the magnetotail and auroral regions. The second set of papers covers the upstream region, the bow shock and magnetosheath. The last set of papers covers the magnetopause in the mantle and boundary layer, and the polar cusp. Papers that were not so easily classified were placed before and after these three large groupings.

In closing we would like to thank the referees who worked so hard in reviewing these papers. As a result of their efforts the papers in this volume have been significantly strengthened but at the expense of some delay in the publication date. The referees who agree to be identified were as follows: V. Angelopoulos, J. Bleckl, E. Burgess, S.-Wu Chang, J. Chen, W. Daughton, R. Denton, J. Pedder, F. Ferrich, H. Funsten, S. Fuselier, M. Gedalin, F. Gratton, M. Henderson, K. Khurana, G. Le, L. Lyons, A. Matsuo, A. Miura, R. Nakamura, P. O’Brien, T. Olsager, B. Popielawska, P. Pritchett, S. Schwartz, R. Schoedel, V. Sergeev, D. Sibeck, G. Sicre, P. Song, D. Southwood, R. Strangeway, K. Szego, M. Tsurutaya, T. Terasawa, K. Trattner, N. Tsyganenko, H. Vruchten, D. Winne, P. Yoon and E. Zesta. Last but not least we would like to thank Anne McGlynn, who oversaw the review, copy editing and submittal to the publisher. She made our job very much easier and we wish her well in her (voluntary) retirement that began with the completion of this volume.

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