

PEM027-09

Room: Function Room B

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Inner magnetosphere-ionosphere coupling tutorial

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One of the biggest problems facing the heliophysics community is the splintering of research efforts into individual system domains despite the acknowledgment that we live in a tightly coupled system. Even within subgroups, we often focus our attention on individual aspects of the coupled system (the radiation belts, ring current or plasmasphere) or even on different measurements (waves, DC fields, particles of various energies). More detrimental to our understanding is that the ionosphere and magnetospheric communities attend different meetings, train our students at different institutions, and usually do not read each others research.

The goal of this tutorial is to describe many ionospheric parameters that are routinely measured that can provide important context to space-based observations of magnetospheric dynamics, including heavy ion outflow observations, ionospheric boundaries that map to magnetospheric boundaries of interest including the plasmopause and auroral boundaries, ionospheric convection maps inferred from radar and magnetometer inversions, global ULF wave power intensity, estimates of mass density using ULF resonance observations, and vertical profiles of the topside ionosphere and plasmasphere using GPS tomographic techniques.

The tutorial will conclude with a summary of recent studies that have greatly benefited by combining ground-based ionospheric measurements with in situ inner magnetospheric measurements. It is hoped that the tutorial will spawn discussion and the formation of new collaborations of researchers that study different domains of the heliophysics system.

Keywords: Space Physics, Magnetosphere, Ionosphere, heliophysics