

COMPLEX SYSTEMS LINKAGE IN THE SOLAR-TERRESTRIAL ENVIRONMENT

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The solar-terrestrial environment can be characterized as a complex system since it exhibits such characteristics as non-linear behavior and various forms of self-regulation. Magnetospheric convection appears to have multiple response modes depending upon the level and nature of the driver. Developing an understanding of the magnetosphere and its response to solar wind drivers requires multi-scale descriptions and analysis. This has implications for observations, modeling and analysis of the global system. I will discuss the current state of understanding in the linked global geospace system and the present challenges in data acquisition and numerical simulation of the solar-terrestrial environment. Specific examples will be taken from recent numerical simulations of the October, 2003 "Halloween" storms using the Michigan Space Weather Modeling Framework to simulate the region from the solar surface to the Earth's upper atmosphere and thermosphere.