

Space Physics Seminar

Thursday, September 28, 2017

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Estimations of dB/dt for Extreme Storm Sudden Commencements

Geomagnetically Induced Currents, or GICs, remain one of the biggest space weather threats to society. A critical first step to mitigating this threat is achieving the ability to model and forecast the time rate of change of the surface magnetic field, dB/dt . A recent focus has been placed on exploring the extremes to learn the limits of our vulnerability. This talk first shows results from a numerical simulation of geomagnetic sudden commencements driven by solar wind conditions given by theoretical-limit extreme coronal-mass ejections (CMEs) estimated by Tsurutani and Lakhina [2014]. These values are used to drive three coupled models: a global magnetohydrodynamic (MHD) magnetospheric model (BATS-R-US), a ring current model (the Rice Convection Model, RCM), and a height-integrated ionospheric electrodynamics model (the Ridley Ionosphere Model, RIM), all coupled together using the Space Weather Modeling Framework (SWMF). The limitations of these predictions are then explored, with an emphasis placed on the shortcomings of the ionosphere model. Proposed solutions to these problems are presented and a new, multi-institution effort to improve dB/dt predictions is introduced.

4:00pm in CAS 502. Refreshments served at 3:45pm in CAS 500.

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Next Week
Geronimo Villanueva
GSFC