

## **QUANTIFYING ENERGY CIRCULATION IN THE NEAR-EARTH SPACE**

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Currently, the global simulations based on the magnetohydrodynamic (MHD) theory provide the only self-consistent method to describe the coupled solar wind - magnetosphere - ionosphere plasma system using upstream solar wind conditions as input. We investigate both energy transfer and dissipation in the solar wind - magnetosphere - ionosphere system using our GUMICS-4 global MHD simulation. We quantify the energy flux through the magnetopause, the dynamo power associated with the magnetopause reconnection, and dissipation in various sinks in the magnetosphere. We identify the parameters in the solar wind that control the energy circulation both spatially and temporally. The GUMICS-4 simulation results are systematically compared against in-situ and remote sensing data from various sources.

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