



## **Energy budget of the ionosphere-thermosphere system at multi-scale and its importance for space weather**

Olga Verkhoglyadova (1), Xing Meng (1), Dogacan Ozturk (1), Stephen Kaeppler (2), and Anthony Mannucci (1)  
(1) Jet Propulsion Laboratory, Pasadena, United States (olga.verkhoglyadova@jpl.nasa.gov), (2) Clemson University, Clemson, United States

Energy flow in the geospace environment can provide insights into physical mechanisms and efficiency of the coupling between different regions. Understanding the energetics can improve space weather nowcast and forecast efforts. We focus on the electromagnetic part of the high-latitude ionosphere-thermosphere (IT) system energy budget, which is highly variable and driven by space weather disturbances. We briefly overview estimation of the Poynting flux and Joule heating using satellite, rocket and ground-based measurements. Next, we demonstrate the importance of temporal and spatial scales of the physical processes for estimating the IT heating, followed with a case study of model and observation-based estimates of the Joule heating during 2 March 2017. We conclude with comparison of the approaches in estimation of the multi-scale energy budget for the IT system.