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On the Substorm-Upper Atmospheric Joule Heating using THEMIS Observations: A Case Study

E. C. Kalafatoglu (1), Z. Kaymaz (2), V. Angelopoulos (3), and D. G. Sibeck (4)

(1) Istanbul Technical University, Faculty of Aeronautics and Astronautics, Istanbul, TR, (ceren.kalafatoglu@itu.edu.tr) , (2) Istanbul Technical University, Faculty of Aeronautics and Astronautics, Istanbul, TR, (zerefsan@itu.edu.tr), (3) University of California, Berkeley, Space Science Laboratory, CA, USA, (vassilis@ssl.berkeley.edu), (4) NASA/Godard Space Flight Center, Greenbelt, MD, USA, (David.G.Sibeck@nasa.gov)

We study the joule heating in the upper atmosphere using THEMIS spacecraft observations of substorms. Examination of AU and AL indices showed that a moderate substorm occurred in March 8, 2008. The northern hemisphere ground magnetometers displayed a moderate decrease in the X-component on the order of 110 nT. Corresponding ACE solar wind and magnetic field data indicate a CME with a velocity up to 500 km/sec and Bz with -10 nT. THEMIS spacecraft were at an appropriate location to detect the substorm signatures. THEMIS data allow us to compute the energy deposited into the magnetotail and joule heating in the upper atmosphere for this case. In this presentation, we will present our preliminary results on the upper atmospheric heating resulting from the substorms towards an effort to compare and verify different theoretical and numerical models of the magnetotail-upper atmosphere coupling.