EPSC Abstracts
Vol. 11, EPSC2017-310, 2017
European Planetary Science Congress 2017

Model-guided quantitative analysis of Juno's observations of MeV-energy electrons at Jupiter

D. Santos-Costa (1), H. Becker (2), P. Kollmann (3), C. Paranicas (3), B. Mauk (3), S. J. Bolton (1), S. M. Levin (2), J. L. Joergensen (4), A. Adriani (5), S. Gulkis (2), M. A. Janssen (2), R. M. Thorne (6), and J. E. P. Connerney (7,8)
(1) Southwest Research Institute, Space Science Department, United States, (2) Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, United States, (3) The Johns Hopkins University Applied Physics Laboratory, Laurel, MD, United States, (4) DTU Space, National Space Institute, Technical University of Denmark, Kgs Lyngby, Denmark, (5) INAF, Istituto di Astrofisica e Planetologia Spaziali, Rome, Italy, (6) Retired, (7) Space Research Corporation, Annapolis, MD, United States, (8) NASA Goddard Space Flight Center, Greenbelt, MD, United States (dsantoscosta@swri.edu)

Abstract

We describe how assimilation of radiation belt data, from high energy radiation environment measurements inferred from instruments' background noise (i.e. the Radiation Monitoring data sets: SRU, ASC, and JIRAM) and Juno JEDI particle instrument (SSD and SSDs witness-shielded detectors), with radiation belt models are used to improve our knowledge about how MeV-energy electrons are distributed near the inner edge of trapping regions at Jupiter. Our preliminary cross-examination of inferred data sets indicates which data sets can be implemented in our work as model constraints for the magnetospheric region beyond Io's orbit, and those available to validate our model predictions close to the planet. In this paper, data sets from Juno's first two science passes (i.e. PJ1 and PJ3) and models of electrons belts are combined to describe the MeV-energy electron populations at high latitudes and near loss cones inside $\sim$15 R_J. We discuss how a better understanding of Jupiter's MeV-energy electron distributions in energy, pitch-angle, and L-shell helps to improve models of Jupiter's synchrotron emission which in turn supports Juno MWR investigation of Jupiter's microwave emissions.

Acknowledgements

This work was sponsored by Southwest Research Institute, the Jet Propulsion Laboratory/California Institute of Technology, and the Johns Hopkins University Applied Physics Laboratory under contracts with the National Aeronautics and Space Administration.