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Reconciling Juno and past mission datasets to improve large-scale models of radiation-belt electron and radio emission distributions at Jupiter

Daniel Santos-Costa[1], Frederic Allegrini[1], Rob Wilson[2], Peter Kollmann[3], George Clark[3], Barry Mauk[3], Jack Connerney[4], John L. Jorgensen[5], Samuel Gulkis[6], Michael A. Janssen[6], Fabiano Oyafuso[6], Shannon T. Brown[6], Steven M. Levin[6], Heidi N. Becker[6], and Scott J. Bolton[1]

[1]Southwest Research Institute, Space Science Department, San Antonio, USA (dsantoscosta@swri.edu)
[2]Laboratory for Atmospheric and Space Physics, Boulder, CO, USA
[3]Johns Hopkins University Applied Physics Laboratory, Laurel, MD, USA
[4]NASA Goddard Space Flight Center, Greenbelt, MD, USA
[5]DTU Space, Lyngby, Denmark
[6]Jet Propulsion Laboratory, Pasadena, CA, USA

We present our latest model of electron radiation belts developed for a large region of Jupiter's magnetosphere (1-50 Rj). For the region inward of Io, electron distributions are computed from a computational code that solves the governing three-dimensional Fokker-Planck equation. This physics-based model accounts for different mechanisms to discuss the energy and spatial distributions of electrons for L values between 1 and 5. The model for the innermost magnetospheric region is expanded to the middle magnetosphere using an empirical approach. In this paper, we first show how our large-scale model of Jupiter's electron radiation belts agrees with data sets from past missions (Pioneer 10 and 11 GTT, Galileo EPD and EPI measurements). We then focus on our effort to combine Juno (JEDI, JADE Electron Ambient Background Counts) and Galileo EPD (> 1.5, 11.5 MeV) datasets to improve our model for both the region beyond Io and the inner edge of the Jovian electron radiation belts. Finally, simulations of Jupiter's synchrotron emission are presented to gauge the contribution of ultra-energetic electrons trapped beyond L ~ 3 at different latitudes to radio emission observed by Juno MWR.