



Three dimensional data-assimilative VERB-code simulations of the Earth's radiation belts: Reanalysis during the Van Allen Probe era, and operational forecasting

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The Versatile Electron Radiation Belt (VERB) code 2.0 models the dynamics of radiation-belt electron phase space density (PSD) in Earth's magnetosphere. Recently, a data-assimilative version of this code has been developed, which utilizes a split-operator Kalman-filtering approach to solve for electron PSD in terms of adiabatic invariants. A new dataset based on the TS07d magnetic field model is presented, which may be utilized for analysis of past geomagnetic storms, and for initial and boundary conditions in running simulations. Further, a data-assimilative forecast model is introduced, which has the capability to forecast electron PSD several days into the future, given a forecast Kp index. The model assimilates an empirical model capable of forecasting the conditions at geosynchronous orbit. The model currently runs in real time and a forecast is available to view online <http://rbm.epss.ucla.edu>.