



Numerical Techniques for Coupled Ring Current - Radiation Belts Modelling

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The dynamics of electrons in the Earth's radiation belts can be described by the Fokker-Planck equation, which includes radial and local diffusion processes. The Versatile Electron Radiation Belt (VERB) code was developed to solve the Fokker-Planck equation for electron PSD. It incorporates a range of numerical techniques, which are appropriate for this purpose. The code has been recently extended to include convection and now solves the convection-diffusion problem in 4D.

This report is devoted to several numerical algorithms for modeling of the Earth's radiation belts. We concentrate on a comparison of 3rd and 9th-order schemes for solution of an advection problem, and show some results on the basis of the numerical solution of the local diffusion problem including mixed terms in 2D. Recent 4D modeling of storm events using the VERB-4D code will be also presented.