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3D and 4D Simulations of the Dynamics of the Radiation Belts using VERB code

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Modeling and understanding of ring current and higher energy radiation belts has been a grand challenge since the beginning of the space age. In this study we show long term simulations with a 3D VERB code of modeling the radiation belts with boundary conditions derived from observations around geosynchronous orbit. We also present 4D VERB simulations that include convective transport, radial diffusion, pitch angle scattering and local acceleration. We show that while lower energy radial transport is dominated by the convection and higher energy transport is dominated by the diffusive radial transport. We also show there exists an intermediate range of energies for electrons for which both processes work simultaneously.