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Stormtime Electric Fields

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We use a new global electromagnetic model magnetosphere to model the large-scale electric fields associated with the magnetic storms. The model provides, for the first time, global electric fields consistent with realistic magnetic field configurations and, especially, with the temporal variations of the magnetic field. The electrostatic field is given as a boundary condition by an ionospheric convection electric field. The input parameters of the model are driven by solar wind conditions in the sense that, for example, the cusp location, sub-solar point, and tail diameter are obtained through their statistical dependence on the solar wind parameters. The main emphasis of this work is on the electric fields induced by the compression associated with the storm sudden commancement. The role of such fields is discussed in terms of particle dynamics.