Geophysical Research Abstracts, Vol. 9, 06299, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-06299
© European Geosciences Union 2007

TRANS4, a new coupled electron/proton transport code – Comparison to observations above Svalbard using ESR, DMSP and optical measurements

C. Simon (1), J. Lilensten (1), J. Moen (2,3), J.M. Holmes (3), Y. Ogawa (4), K. Oksavik (5) and W.F. Denig (6,7)

(1) Laboratoire de Planétologie de Grenoble (Grenoble, France), (2) Plasma and Space Physics Group, Department of Physics, University of Oslo (Norway), (3) Department of Arctic Geophysics, University Centre in Svalbard (UNIS, Norway), (4) Solar-Terrestrial Environment Laboratory, Nagoya University (Japan), (5) The Johns Hopkins University Applied Physics Laboratory (Laurel, Maryland, USA), (6) Space Vehicles Directorate, Air Force Research Laboratory (Hanscom AFB, Mass., USA), (7) Now at National Geophysical Data Center, NOAA, (Boulder, Colorado, USA)

We present a numerical kinetic/fluid code for the ionosphere coupling proton and electron precipitation effects. It solves the fluid transport equations up to the eighth moment, and the kinetic equations for suprathermal particles. Its new feature is that for the latter, both electrons and protons are taken simultaneously into account, while the preceding codes (TRANSCAR) only considered electrons. Thus it is now possible to compute in a single run the ionospheric parameters (electrons and ion densities, temperatures, velocities, heating fluxes) due to both proton and electron precipitation. This code is successfully applied to a multi-instrumental data set recorded on 22 January 2004. We make use of measurements from the Defence Meteorological Satellite Program (precipitating particle fluxes), the EISCAT Svalbard Radar (ionospheric parameters), an all-sky camera (thermospheric oxygen lines) and an Ebert-Fastie spectrometer at Ny-Ålesund (H_α line). We compare the results of the code with observations. We also show the relative effects of protons and electrons as to the electron densities.