Geophysical Research Abstracts
Vol. 17, EGU2015-9962, 2015
EGU General Assembly 2015

Impact of the dipole tilt angle on the ionospheric plasma in the outer plasmasphere

Aurelie Marchaudon and Pierre-Louis Blelly
IRAP, CNRS/UPS, Toulouse, France (aurelie.marchaudon@irap.omp.eu)

We have developed a new interhemispheric 16-moment based ionosphere model. This model describes the field-aligned transport of the multi-species ionospheric plasma (6 ions) from one hemisphere to the other, taking into account source processes at low altitudes (photoionization, chemistry) and coupling with suprathermal electrons. We simulate the convection and corotation transport of closed flux tubes in the outer plasmasphere for tilted/eccentric dipolar magnetic field configuration.

We ran the model in solstice and equinox conditions and for two plasmapause boundary conditions: one corresponding to standard conditions with a stagnation point at 4.5 Earth radii (RE) and 15h Magnetic Local Time (MLT) and one corresponding to very quiet conditions with a stagnation point at 6 RE and 15h MLT. For each season/stagnation simulation, the model is run for 30 days before the equinox/solstice date in order to eliminate the transients.

The goal is to study the combined effect of the tilt of the magnetic field and the rotation axis on the field-aligned dynamics and overall equilibrium of the subauroral ionosphere. In the classical representation of the plasmasphere, the ionosphere only depends on angular MLT sector. We will show that due to the tilt effect, this view is erroneous and no real dynamic equilibrium is reached, in particular close to the stagnation point where we can observe large day-to-day variations in the ionospheric parameters. Finally, we will present the temperatures anisotropy development along the flux tube for different positions of the stagnation point.