TRANSPORT AND ACCELERATION OF PLASMA IN THE INNER MAGNETOSPHERE

N.Yu. Ganushkina[1,2]

[1] *Finnish Meteorological Institute, Helsinki, Finland,* [2] *University of Michigan, Ann Arbor, USA*

The existence of the large-scale convection provides a source of plasma and electric fields in the nightside magnetosphere. Recent studies have shown that the earthward transport of plasma and magnetic flux occurs in the form of short duration, high-speed plasma flows, rather than as slow, steady convection, not only during active times but also during low activity periods. Observations and simulation studies of impulsive electric fields during substorms associated with the fast flows have suggested that these fields are the driving force of the particle injections. They play an important role during storm times. For example, although the increased large-scale convection is able to transport and accelerate ring current particles up to medium energies, the high energies reached by ring current ions can be accounted for by the action of substorm-associated electric fields. The formation of the ring current is a combination of convection and pulsed inward shifts and consequent energization. It is pointed out that a concept of combination and coupling of multiple sources and processes of different scales, which produce multiple effects, gives more accurate description of the inner magnetosphere driving. We use the Inner Magnetosphere Particle Transport and Acceleration Model (IMPTAM) model to simulate particle transport from the plasma sheet to the inner magnetosphere regions during quiet and storm times to support the above mentioned concept. We compare the obtained modeled particle fluxes with observations from Cluster, Polar, THEMIS and geostationary satellites, such as, GOES and LANL.