



## **Solar wind electric field driving of magnetospheric activity: Is it velocity or magnetic field?**

**T. I. Pulkkinen** (1), C. C. Goodrich (2), J. G. Lyon (3)

(1) Finnish Meteorological Institute, Helsinki, Finland, (2) Center for Space Physics, Boston University, Boston, MA, USA, (3) Dartmouth College, Department of Physics and Astronomy, Hanover, NH, USA

The Lyon – Fedder – Mobarry global magnetohydrodynamic simulation code is used to demonstrate that the magnetospheric response to stronger solar wind electric field is different depending on whether the increase is caused by an increase in the solar wind speed or the interplanetary magnetic field. We study a period of steady magnetospheric convection, which was driven by a moderately southward IMF and a steady and quite low solar wind speed. Using several simulation runs, we show that increasing the magnetic field leads to reconnection closer to the Earth but the steady state of the magnetotail is not changed. On the other hand, increasing the solar wind speed leads to a much more variable magnetosphere with localized, bursty reconnection in the tail. It is concluded that while the electric field controls the amount of energy entry into the magnetosphere, the solar wind speed is critical in determining the dynamic state of the magnetosphere.