

# 3PM1b: Quasi-static coupling of the magnetosphere-ionosphere-thermosphere system

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Themes which the poster and oral presentations highlighted:

- **Data from different mission & ground observations compliment each other and enhance the science return** (examples from the session: statistical model of ring current by combining Cluster and Swarm data; study of temporal changes during geomagnetic active periods at high latitude by combining Swarm and AMPERE FAC with DMSP particle precipitation and in-situ GEOS and MSS data; new empirical FAC models shows now variation with solar radiation by combining Swarm, CHAMP, Orsted data; improve data assimilation by combining Swarm with AMPERE/SuperMag, SuperDARN data).
- **Swarm data provides fine scale –spatial/temporal- structure which enables new science and discoveries** (examples from session: importance of Alfvén waves in MI coupling; development of next generation of data assimilation methods by capturing toroidal and poloidal magnetic field effects as well as the global and fine scale which enable us to examine phenomena such as cusp neutral density enhancements; sparks development of new methods to capture local features such as wavelets; Swarm data discovered high ion velocity regions during quiescent midnight R1/R2 current closure)
- **The importance to quantify the auroral conductances** (examples from the session: from FAC and electric fields the conductances can be derived but in practice there are challenges– applied and tested in data assimilation, for quality assessment of Swarm electric field measurement at high latitude, 4 presenters highlighted the importance of knowing ion convections and associated aurora conductance)

- **New models and methods are developed with Swarm data** (from the session: SECS method is extended to low latitudes to be able to capture poloidal current effects; SECS methods in aurora region produces ionospheric current and will be available to the community in 2017; statistical high latitude FAC with parametrization; statistical study of Poynting flux at high and now midlatitude latitude finding flow from the summer to winter hemisphere

**Recommendations:**

- Continue support of studies of combined satellite and ground observatory data to enhance the scientific return.
- Continue to support tools to easily find conjunctions of the different present and future satellite missions (e.g. e-POP, Swarm, Icon)
- Continue the support for the development of new methods to exploit the small scale features captured by Swarm e.g., for data assimilation or models/derived products.
- Discussion about constellation in the session: Bravo should stay up as long as possible to have a long time record and as a reference- presenters saw no reasons to lower Bravo; Alpha and Charlie should have separation of 2-3 degree to capture the mesoscale features.