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Bursty reconnection modulating the substorm current wedge, a substorm case study re-analysed by ECLAT tools.

Hermann Opgenoorth (1), Laurianne Palin (1), Karin Ågren (1), Tatjana Zivkovic (1), Gabor Facsko (2), Victor Sergeev (3), Marina Kubyshkina (3), Alexander Nikolaev (3), Steve Milan (4), Suzanne Imber (4), Kirsti Kauristie (2), Minna Palmroth (2), Max van de Kamp (2), Rumi Nakamura (5), and Peter Boakes (5)

(1) Swedish Institute of Space Physics, Uppsala Division, Uppsala, Sweden (opg@irfu.se), (2) Finnish Meteorological Institute, Arctic research unit, Helsinki, Finland, (3) St. Petersburg State University, Physics Faculty, St. Petersburg, Russia, (4) Department of Physics and Astronomy, University of Leicester, Leicester, United Kingdom, (5) Space Research Institute, Austrian Academy of Sciences, Graz, Austria

Multi-instrumental data mining and interpretation can be tedious and complicated. In this context, the ECLAT (European Cluster Assimilation Technology) project was created to « provide a novel and unique data base and tools for space scientists, by providing an upgrade of the European Space Agency's Cluster Active Archive (CAA). » How can this new tool help the space plasma physics community?

Here we demonstrate the power of coordinated global and meso-scale ground-based data to put satellite data into the proper context.
We re-analyse a well-isolated substorm with a strong growth phase, which starts right overhead the Scandinavian network of instruments on 8 September 2002. This event was previously studied in detail by Sergeev et al (2005), based on a THEMIS-like configuration near-midnight using a unique radial constellation of LANL (∼6.6Re), Geotail and Polar (∼9Re), and Cluster (∼16Re).

In this new study we add detailed IMAGE spacecraft and ground-based network data. Magnetospheric models are specially adapted using solar wind conditions and in-situ observations. Simulation results are compared to the in-situ observations and discussed. We show how - both before and after substorm onset - bursty reconnection in the tail modulates the localised field aligned current flow associated with the substorm current wedge.