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ECLAT dynamic simulations and Cluster footprint comparison study

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The European Commission funded the European Cluster Assimilation Techniques (ECLAT) project as a collaboration of five leading European universities and research institutes. A main contribution of the Finnish Meteorological Institute (FMI) is to provide global MHD runs with the Grand Unified Magnetosphere Ionosphere Coupling simulation (GUMICS) based on one year real solar wind data. Solar wind magnetic field, density, temperature and velocity data are downloaded from the OMNIWeb open database and a special input file is created for each Cluster orbit. The Cluster orbits are divided into 12 slices allowing parallel computation and each slice has an average tilt angle and IMF B_x. Each simulation starts one hour before the Cluster perigee to provide time for building up a magnetosphere in the simulation space and all simulation results are saved every 5 minutes (in physical time).

Certain parameters (temperature, density, velocity, magnetic field etc.) are dumped in the simulation space along the Cluster spacecraft orbit. Quickplots are created from GUMICS ionosphere and magnetosphere simulations. The ionospheric footprints of Cluster spacecraft are determined from observations and dynamic simulations. The results of the two different methods are compared for several selected events. All products will be available at the Cluster Active Archive soon.