



New space weather products from the Swarm satellite constellation mission: Auroral electrojets and oval boundaries

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The Swarm mission with three satellites in near-polar orbits provides an excellent opportunity for studies related to the ionospheric currents, aurora, magnetosphere-ionosphere coupling, and space weather especially at high latitudes. As part of the Swarm DISC (Data, Innovation and Science Cluster) activity "Auroral Electrojet and auroral Boundaries estimated from Swarm observations (Swarm-AEBS)", a set of new Swarm data products that characterize the auroral electrojets and auroral oval boundaries will be derived from Swarm magnetic field measurements. These include the electrojet sheet current density as well as the total horizontal sheet and associated large-scale field-aligned current density along the Swarm orbit ionospheric footprints at auroral latitudes, estimated using the Spherical Elementary Current System (SECS) method. The electrojet sheet current density will also be estimated using the Line Current (LC) method as this method allows extending the analysis to cover the polar cap region as well. The electrojet boundaries and peaks will also be provided, the latter characterized in terms of peak current density and peak magnetic field disturbance at ground level. The set of products is completed by auroral oval boundaries, associated with auroral precipitation, that are estimated from the presence of small-scale (<150 km) field-aligned currents. The products will be determined from the launch of the Swarm satellites (22 November 2013), and will be provided as regular daily updates to the Swarm Payload Data Ground Segment (PDGS) with visualization through the Virtual Research Platform VirES. The first data are expected to become available during autumn 2018.