



ESA Field Aligned Currents – Methodology Inter-Comparison Exercise

Lorenzo Trenchi

ESA – ESRIN, Directorate of Earth Observation Programmes, Largo Galileo Galilei 1, 00044 Frascati (Roma), Italy

Currently, ESA provides two different estimates of the Field Aligned Currents (FACs) from Swarm magnetic field data, based on single or dual-spacecraft approach:

- single spacecraft FAC products, based on 1 Hz magnetic field data, which provide three individual products for each of the three satellites
- dual spacecraft FAC product, based on 1 Hz magnetic field data collected by the lower pair (Swarm A and Swarm C), low pass filtered at 20 seconds time scale in order to meet the time stationarity assumption.

Various ESA projects are developing new methods to compute the FACs and the ionospheric currents from Swarm data. Also several proposals in response to the first ESA Swarm Call for Ideas for new data products and services (May 2016) focussed on FACs, suggesting possible new approaches to estimate FAC densities and quality indicators.

In order to identify a possible evolution of the present FAC products, and / or potential new FAC products and FAC quality indicators, ESA organized a FAC Methodology Inter-comparison Exercise (FAC-MICE), which consisted in a comparison of the different FAC methods, based on a test dataset of 28 Swarm auroral crossings. This comparison allowed to highlight the strenghts of the various approaches, suggesting that several FAC products are useful for different purposes.

This presentation illustrates the main results of this comparison, and the possible implementation of an open source platform for user definable FAC calculation.