

EGU2020-22445

<https://doi.org/10.5194/egusphere-egu2020-22445>

EGU General Assembly 2020

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Recent results from scientific ESA Swarm projects

Lorenzo Trenchi¹, Jerome Bouffard¹, Anja Stromme¹, Octav Marghitu², Kirsti Kauristie³, Adrian Blăgău², Joachim Vogt⁴, Balázs Heilig⁵, and Péter Kovács⁵

¹ESA

²Institute of Space Sciences

³FMI

⁴Jacobs University

⁵Mining and Geological Survey of Hungary

This presentation illustrates the recent results obtained in the context of scientific ESA Swarm projects. The project “Swarm data quality Investigation of Field-Aligned Current products, Ionosphere, and Thermosphere system” (SIFACIT) has been recently extended in order to achieve two additional objectives: To provide to users an open-source program package to estimate Field Aligned Current (FAC) density and quality indicators, using single- and multi-s/c methods from Swarm data; To study the Joule heating of the ionosphere–thermosphere system on multiple scales, using Swarm data, together with conjugate ground information and simulations.

The other project illustrated here is EPHEMERIS (nEw sPace weatHER inforMation Exploited from the SwaRm observationS). This project is investigating the Midlatitude Ionospheric Trough (MIT) with Swarm data, and will also develop a new MIT Swarm data product based on Swarm L1b Langmuir Probe (LP) data. The second part of the project will develop a quasi-real-time intermittency index (IMI) for the detection of ionosphere plasma irregularities along the Swarm orbit, which can be responsible for errors and loss of lock in GPS signals. A statistical comparison of the IMI index with GPS signal from ground based receivers will be performed, in order to identify the ionospheric irregularities at Swarm altitude responsible for scintillations in GPS signals.