



F region postsunset plasma structures at low latitudes deduced from the Swarm satellite constellation

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ESA's constellation mission Swarm was successfully launched on 22 November 2013. The three satellites are orbiting the Earth at 470 km and 520 km altitude. The spacecraft carry instruments to monitor the plasma density and magnetic field magnitude and their variations with high quality. We will present results on low latitude F region post sunset plasma irregularities (EPIs). EPIs are characterised by severe plasma density gradients and distinct magnetic field variations and cause GPS signal detection degradations. Our results show rather small scale sizes of EPIs (>44 km) in the zonal direction as well as more fragmented irregularities in the southern hemisphere where the ambient magnetic field is lower than on the northern hemisphere.

From the Swarm spacecraft constellation with a zonal separation of about 150 km, we conclude that larger zonal scale sizes of irregularities exist in the early evening hours (around 1900 LT) and that the irregularities break into smaller structures later in the evening. However, we also observe examples where only one satellite detects EPIs, while the others show undisturbed ionization. We will present also such an example, and compare these observations with detections of depletions on satellites from other missions.

There exist a strong link to low-latitude space weather: the plasma irregularities give rise to severe disturbances of GPS navigational signals and these can also be monitored on board the Swarm satellites simultaneously with the plasma irregularities.