



The search of the cross correlation between the PERUN lightning detection system and satellite registrations of the thunderstorms effects above Poland with use of DEMETER and Swarm data

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The main goal of this presentation is discussion of the cross correlation between the ground based (PERUN) and satellite (DEMETER, Swarm) registrations of the effects related to the thunderstorms. The strong thunderstorm activity is associated with the electromagnetic connections and interactions between atmosphere, ionosphere and magnetosphere.

DEMETER has clearly shown, that thunderstorms can affect the ionosphere even at altitude of its orbit (680 km). The Swarm constellation comprises 3 identical satellites. Two of them are operating on the circular, polar orbits with initial altitude 460 km. Third one has also circular orbit, but of altitude 530 km. The orbits of the first 2 satellites are in almost the same plane, but third one is close to perpendicular to the first two. The payload containing Vector Field Magnetometer, Absolute Scalar Magnetometer and Electric Field Instrument among other allows to study the effects in the ionosphere generated by thunderstorms. The discussion of the observation done by DEMETER and Swarm satellites will be given in the presentation. The Swarm data are variations of the magnetic field with sampling frequency 50 Hz and electron density from Langmuir probe with sampling 1 Hz. FFT transformation applied to the δB_i residuals gives the time-frequency spectrograms for δB_i along the orbit in the frequency range up to 25 Hz. Identification of signals generated by strong electric discharges is based on the analysis of time-frequency spectrograms for the wave data. The satellite data are correlated with PERUN system registration of the thunderstorms in Poland.

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