



A statistical study of short period waves in the ionosphere above Central Europe

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We present a statistical study of waves of periods 0.5-6 min that occurred in the ionosphere above the Czech Republic. The dataset covers one year period from April 2013 to March 2014. Data were obtained from Doppler ionospheric sounding. The sounding is based on measurements of frequency shift between the transmitted wave of a stable known frequency and the wave received after its reflection in the ionosphere. It is a suitable tool for observations of wave activity in the ionosphere, particularly in the period range up to 60 min. The main objective of the study was to find whether there exist a preferred season and time of the day in the occurrence of these waves.

We identified altogether 247 events of duration between 1 minute and 13 hours. The highest number of events occurred in September 2013 (44 events). Contrary, only 5 events appeared in May 2013. In the diurnal course, the waves tend to occur mainly between sunset and sunrise. The described diurnal variability can be to some measure explained by diurnal changes of electron concentrations in the ionosphere and consequent changes of the reflection height of the Doppler sounding wave. The 3.59 MHz radio wave usually reflects from the ionospheric F layer at night and from the E layer during the daytime. When the sounding wave reflects in the E region, it usually experiences zero or only negligible Doppler shift. Similarly, low number of events in May (and also in July) can be related with seasonal variability of electron concentration in the ionosphere.

Sources of oscillations measured by the Doppler sounding system in the studied period range of 0.5-6 min include infrasound, geomagnetic micropulsations or transient changes of electron concentration caused by x-rays arrivals. We will present the interpretation of the statistical study with relation to the stated sources.