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Geomagnetic conditions during UV-microbursts measurements by PAIPS photometer

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During 3 seasons of PAIPS (Pulsating Aurora Imaging System) photometer at Verkhnetulomsky observatory operation a number of events which represent a series of sort bright bursts in a 300-400 nm wavelength range (UV-microbursts) was measured. It is a most transient form of auroral emission which can be caused by high-energy electrons microbursts precipitation. UV-microbursts series duration ranges from 10 s to ~1 hour. Time interval between pulses is not constant and varies in a range between 100 ms and 5 s. The typical amplitude is around 10^4–10^5 photon/cm^2 sr s.

To clarify the origin of UV-microbursts analyses of geomagnetic conditions was done. It was shown that in most cases UV-microbursts are observed during weakly disturbed geomagnetic conditions (average K_P index is 1+) at evening sector of MLT. These events associated with the weak geomagnetic storm recovery phase (Sym-H index about 100 nT).

Two events (21.11.2021 and 23.02.2023) occurred in morning MLT sector during the substorms recovery phase. For these events the detailed analyses of geomagnetic disturbances were studied. Global structure of field-aligned currents was reconstructed using AMPERE magnetic perturbation data. Ionospheric equivalent currents calculated by ground magnetometers of IMAGE (International Monitor for Auroral Geomagnetic Effects) network were analyzed. Local variations of magnetic field were measured by a magnetometer at Verkhnetulomsky observatory and demonstrated simultaneous sharp fluctuations of geomagnetic field with UV-microbursts.

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