

Case study of the Pi3 geomagnetic pulsations associated with auroral break-ups (07.10.1994)

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Two wave packets of Pi3 geomagnetic pulsations that occurred on October 07, 1994 in association with two different events of the auroral break-up have been analyzed using the IMAGE magnetometer and riometer network data. The Pi3 pulsations showed the different spectral distribution in the auroral zone and in the polar cap, however, the enhancement of the 5-6 mHz frequency band was common for both latitude areas. The similar band of magnetic field oscillations was recorded in the magnetosphere tail by IMP-8 satellite ($X = -32.5 \text{ Re}$, $Y = 6.4 \text{ Re}$, $Z = 18.4 \text{ Re}$). The wavelet structures of the ground geomagnetic pulsations and the oscillations in the tail magnetic field were compared. Contrary to the ground observations, where the amplitude of the first Pi3 burst was smaller than the second one, the IMP-8 data showed the stronger Bx (compressional component) amplitude in the first Pi3 wave packet. Both pulsation bursts were associated with auroral break ups: the first – with the relative weak pseudo-breakup, the second one – with the typical break-up.

The pseudo-breakup (17.26-17.40 UT) as well as the first Pi3 burst propagated from the south-east to the north-west at the poleward expansion velocity about 1.5 km/s. This pulsation burst was not observed at polar cap latitudes. However the typical break-up (17.40-17.50 UT) as well as the second Pi3 burst propagated from the south-west to the North-East at the poleward expansion velocity about two times larger. So, the pseudo break-up was associated with compressional type of hydromagnetic wave and typical break-up – with Alfvén type of wave, which can propagate far into polar cap.