Electric field oscillation behind pulsating aurora

K. Hosokawa (1), A. Kadokura (2), N. Sato (2), S. E. Milan (3), M. Lester (3), G. Bjornsson (4), T. Saemundsson (4)

(1) The University of Electro-Communications, Chofugaoka 1-5-1, Chofu, Tokyo 182-8585, Japan.
(2) National Institute of Polar Research, Kaga 1-9-10, Itabashi, Tokyo 173-8515, Japan.
(3) Department of Physics and Astronomy, University of Leicester, Leicester LE1 7RH, UK.
(4) Science Institute, University of Iceland, Dunhagi 3, Reykjavik IS-107, Iceland.

We present, for the first time, the modulation of the electric field possibly associated with the occurrence of pulsating aurora. In November 2005, simultaneous campaign-based measurements of pulsating aurora were conducted over Iceland with an all-sky TV camera (ATV) at Tjornes (66.20N, 17.12W) and a SuperDARN radar at Pykkvibaer (63.77N, 20.54W). During an interval within the campaign period, pulsating aurora were observed with the ATV at Tjornes on the morning side, whose frequency was 8 sec. Quasi-periodic oscillations were identified in the Doppler velocity of the radar backscatter co-located with the pulsating aurora, whose amplitude was about 100 m/s. The period of the velocity fluctuations is the same as those of the pulsating aurora. We suggest that these oscillating Doppler velocities are driven by polarization electric fields generated through charge accumulation at the edges of the electron density enhanced region caused by the occurrence of the pulsating aurora.