Characteristics and Wave Source of Nighttime Medium-scale Traveling Ionospheric Disturbances in Subauroral Region

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We often observed propagating wave-like structures which appeared in the OI 630.0-nm airglow observed by our all-sky imager installed at Poker Flat Research Range (65.1N, 147.4W, MLAT 65.6) in Alaska. These events are classified into the medium-scale traveling ionospheric disturbance (MSTID) according to its wavelength and propagating speed. The unique points of our study are; 1) horizontal direction of the electric field can be estimated by the motion of the quasi-corotating aurora [1] appearing simultaneously, 2) neutral winds are simultaneously observed by a Fabry-Perot interferometer.

We had investigated statistical characteristics of these MSTID, using data obtained from November 2001 to April 2002, and reported the following results. The MSTID was observed in almost every evening, and sometimes in the morning, but were not observed at midnight. Typical propagating speed, direction, and wavelength of the wave phenomena are about 135 m/s, southwestward, and about 250 km, respectively. Ray tracing analysis if the MSTID suggests that these waves is propagating from the auroral oval.

In this presentation, we will show analysis results about relationship between the MSTID and background neutral winds, and discuss about the source of the MSTID.

References

[1] Kubota, M., T. Nagatsuma, Y. Murayama, Evening co-rotating patches: a new type aurora observed by high sensitivity all-sky cameras in Alaska, Geophys. Res. Lett., VOL. 30, NO. 12, 1612, doi:10.1029/2002GL016652, June 2003.