

## Thermospheric wind acceleration in the ionospheric trough for Kp = 0+

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Ionospheric trough is a low plasma-density area occasionally appeared at subauroral latitudes, typically seen for period of geomagnetic disturbances. On 20 February 2018, a zonally elongated ionospheric trough was developed from Fennoscandia to North America. Of notable interest was the geomagnetic activity, which was considerably quiet level as represented by Kp index of 0+ for the time interval interested in this study. The ionospheric trough was located at 70-71 deg N and the main auroral oval stayed at 74-76 deg N in the Fennoscandia sector. A minor but obvious auroral enhancement occurred at about 18:30 UT (~21 MLT) near Svalbard archipelago. We call this “pseudo-breakup” in this study. Coinciding with the pseudo-breakup, westward turning of the ionospheric ion velocity from +200 m/s to -200 m/s was detected with the dynasonde at Tromsø, Norway (69.6 deg N), that is, in the ionospheric trough or slightly its equatorward side. At the same time, a collocated Fabry-Perot interferometer (FPI) also detected westward acceleration of the wind starting from +100 m/s (positive eastward) but without change its direction. While some previous publications mentioned the westward acceleration in the vicinity of the substorm growth-phase arc, there are few reports to clearly present the experimental evidence in the ionospheric trough. Causality to produce the westward acceleration of the FPI wind was probably ion drag despite of moderately low plasma density in the ionospheric trough. The relative speed between ions and neutral particles would result in frictional heating, which might lift denser or molecular neutral particles to the upper ionosphere and induce decrease in the ionospheric density through dissociative recombination of the molecular ions.

Keywords: Thermosphere, Ionosphere, trough, Fabry Perot interferometer