R005-P14
ポスター 2：11/25　PM1（13:45-15:45）

#大山 伸一郎 [1,2,3], バンハマキ ヘイキ [3], カイ レイ [3]
([1] 名古屋大学宇宙地球環境研究所, ([2] 国立極地研究所, ([3] オウル大学

Dynamics of high-latitude energy conversion in the upper thermosphere studied with FPI and Dynasonde in Tromsø, Norway

#Shin-ichiro Oyama[1,2,3], Heikki Vanhamäki[3], Lei Cai[3]
([1]Institute for Space-Earth Environmental Research, Nagoya University, ([2]National Institute of Polar Research, ([3]University of Oulu

The process of energy transfer from the ionosphere to the thermosphere at high latitudes was examined using equation $\mathbf{J}\cdot\mathbf{E} = \mathbf{J}\cdot\ \mathbf{E}' + \mathbf{U}\cdot\ (\mathbf{J}\times\mathbf{B})$, where $\mathbf{E}'$ represents the electric field in a reference frame moving with neutral wind, as defined in $\mathbf{E}' = \mathbf{E} + \mathbf{U}\times\mathbf{B}$. The ratio R of $\mathbf{J}\cdot\ \mathbf{E}'$ to $\mathbf{J}\cdot\ \mathbf{E}$ was derived from a 9-year dataset of ion velocity ($\mathbf{V}$) from the Dynasonde and neutral wind ($\mathbf{U}$) from the Fabry-Perot interferometer (FPI) in Tromsø, Norway, categorized by SuperMAG index (SME) and magnetic local time (MLT). The incoming electromagnetic energy converts to thermospheric thermal energy through Joule heating and kinetic energy via wind acceleration by the Lorentz force, resulting in $0 < R < 1$ in the dusk to premidnight sector under moderately active conditions. $R < 0$ occurred under quiet conditions of SME <50 nT from dusk to dawn and over a wide geomagnetic level in the post-midnight sector, indicating the Lorentz force performs negative work on the thermosphere, suspecting electromagnetic energy generated in the F region is transported to the magnetosphere. The ratio R can exceed 1 under quiet conditions from dusk to dawn, with all instances of $\mathbf{U}\cdot\ \mathbf{V} < 0$ corresponding to $R > 1$. During evening and morning hours when $\mathbf{U}\cdot\ \mathbf{V} < 0$ occurs, sunward flow dominates ionospheric plasma convection, causing ion drag to oppose the day-night pressure gradient, yet due to low geomagnetic activity, ion drag cannot overcome the pressure gradient, resulting in opposite directions of the net thermospheric wind field and ionospheric plasma convection.