Conjugate observation of auroral finger-like structures by ground all-sky cameras and the THEMIS sarellite

*Katsuki Nishi[1], Kazuo Shiokawa[1], Erick Donovan[2]

1.Institute for Space-Environmental Research Division for Ionospheric and Magnetospheric Research, 2.Department of Physics and Astronomy, University of Calgary

Aurora dynamics is a manifestation of plasma dynamics in the magnetosphere and auroral emissions are caused by electrons precipitating from the magnetosphere. Investigation of auroral structure helps to deepen our knowledge of dynamical variation of magnetospheric plasma and their connection to the Earth's atmosphere. We expect that these knowledges will be useful for space developments.
In this study, we observed finger-like structures of aurora using the THEMIS satellites and ground all-sky imagers to investigate physical processes that cause auroral fragmentation. We succeeded the first conjugate observation of auroral finger-like structures with magnetospheric satellites and investigated dynamical variation of magnetospheric plasma.
We searched conjugate ground-satellite events for the interval between October 2007 and December 2014. However, we found only one conjugate event that is observed at Narsarsuaq (MLAT: 69.3) in Greenland at 0720-0830UT (0506-0616LT) on 17 February 2012. Investigation of the event produced following observation facts: plasma pressure and magnetic pressure fluctuate in anti-phase with time scales of 5-20min, parallel electron flux and plasma pressure fluctuate in same time scales, and perpendicular ion velocity is very small (less than 50km/s) during the event.

Keywords: THEMIS, All-sky imager, auroral finger-like structure, magnetosphere

