

IMAP/VISIにより磁気嵐回復時に観測されたサブオーロラ帯発光現象

坂野井 健 [1]; 山崎 敦 [2]; 齊藤 昭則 [3]; 穂積 裕太 [3]; Perwitasari Septi[4]

[1] 東北大・理; [2] JAXA・宇宙研; [3] 京都大・理・地球物理; [4] 東北大・理・惑星プラズマ大気

Unusual emission in the sub-auroral region during the recovery phase of magnetic storm obtained with IMAP/VISI

Takeshi Sakanoi[1]; Atsushi Yamazaki[2]; Akinori Saito[3]; Yuta Hozumi[3]; Septi Perwitasari[4]

[1] Grad. School of Science, Tohoku Univ.; [2] ISAS/JAXA; [3] Dept. of Geophysics, Kyoto Univ.; [4] PPARC Tohoku University

<http://pparc.gp.tohoku.ac.jp/~tsakanoi/>

We report unusual emission event in the sub-auroral region obtained with IMAP/VISI occurred in the recovery phase of a big storm in July 2015. IMAP/VISI is a visible imaging spectrometer which aims to measure nightglow emissions from ISS (~400 km altitude) covering the wide range from +51 deg. to -50 deg. in geographical latitude. Two slits of VISI point to +45 deg. and -45 deg. to nadir to achieve a stereoscopic measurement of the airglow and aurora emission. In the nominal operation mode, VISI continuously measures emissions at O2 762 nm, OH or N2 1PG 730 nm and O 630 nm simultaneously with a spatial resolution (plate scale) of ~10 km x 14 km and scan width of ~600 km (mapped to the E-region altitude) perpendicular to the orbital track.

A big storm started on June 21, 2015 and Dst index decreased to 195 nT at 5UT on June. IMAP/VISI measured the dot- or tail-shaped emission in the evening sector of sub-auroral region in the southern hemisphere. The dot or tail structures were continuously measured in successive six orbits during the period from ~1645 UT on June 24 to ~0030 UT on June 25 in the recovery phase of the big storm. We found that the dot- or tail-shaped structure is most distinct in O 630 nm with intensities of a few hundreds Rayleighs, but it is also identified in O2 762 nm and OH/N2 1PG 730 nm. The size of spot or tail was approximately several tens to a few hundreds km. However, no background continuum emission was found associated with the structure. These spot or tail structures were obviously separated from the auroral oval emission with a typical latitudinal gap of ~10 deg. Comparing the VISI data between front FOV and rear FOV, the structure shapes are almost identical. This is the first time we identified these structures separately from the auroral oval since the launch in 2012.

From the facts mentioned above, we suggest that the emission cannot be attributed to city light, lightning fishing boats. It is probably difficult to explain the dot or tail structure by airglow process. It is likely to cause the spot- or tail-shaped emission by auroral precipitating electrons. To produce the emissions at O 630 nm, O2 762 nm and N2 1PG 730 nm simultaneously, electrons in the broadband energy range from low-energy to several keV should be required. In this talk we give the discussion on the mechanism for these structure and the relationship to SAR arc or SAPS.

Acknowledgements

We thank the IMAP science team and the MCE team for their kind support.