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Characteristics of dayside aurora obtained by all-sky imaging observations at South Pole

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Dayside aurora is located at ionospheric foot points of the magnetopause or flank of the magnetosphere, and it can be a clue for understanding of the interaction between solar wind and the magnetosphere. Although global image of dayside aurora has been quantitatively established by UV observation of POLAR satellite, that of dayside visible aurora has not yet been obtained so far. Particularly, it is expected that the OI630nm aurora which is caused by soft electron precipitation will show totally different feature from the UV aurora which is excited by high energy electrons.

We have analyzed auroral monochromatic image data of OI558nm and OI630nm obtained at the Amundsen-Scott South Pole station in years 1998, 1999, and 2002 by an all-sky imager installed by NIPR, and intensity distributions with respect to magnetic latitude and magnetic local time were obtained for the both auroral emissions. These intensity distributions were further examined to see their dendence to Kp index and solar wind parameters.

Main results concluded through the analysis are as follows.

(1) Intensity of OI558nm aurora is bright at magnetic latitudes lower than -75MLAT and in magnetic local time ranges of 0000-1100MLT and 1800-2400MLT. OI630nm aurora is localized in a region of -75MLAT to -85MLAT and 0900-1500MLT. While the result of OI558nm showed good agreement with the result of POLAR UV observation, the result of OI630nm didn't show any agreement with the POLAR UV observation. In addition, distribution of intensity ratio of OI630nm to OI558nm showed values higher than unity in a region of -75MLAT to -80MLAT and 0900-1500MLT, and it had a peak value at -77MLAT and 1230MLT.

(2) Regarding Kp dependence, both OI558nm and OI630nm showed intensity increase with Kp values.

(3) Dependence on IMF showed that: (i) intensities of both OI558nm and OI630nm are larger when Bz is negative compared to a period when Bz is positive, and it is noted that (ii) while OI558nm showed no Bx dependence when Bz is negative, OI630nm showed the following Bx dependence when Bz is negative. While OI630nm showed a region of weak intensity around -70MLAT and 0900-1500MLT when Bx is negative, OI630nm spreads in a region of -65MLAT to -75MLAT in the same MLT sector when Bx is positive. More detailed results will be given at the presentation.