

The study of Jupiter's aurora : bright spot variation in active region

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Jupiter's polar emission is a part of Jovian's aurora features that still receives debates about its origin and behavior of brightness which seem to be unstable. In this work, we study Jupiter's polar emissions on May 13th 2007 observed by Advanced Camera for Surveys (ACS) camera on board the Hubble Space Telescope. We found that active region, which is a section of the polar region, appeared to have a bright spot at time of observations. After the detection of bright auroral spot, the auroral emission in active region became very faint, while reappeared again within about 20 minutes. This reappearing of auroral emission is similar to the behavior of Earth's aurora. The bright spots from two consecutive observations occurred at the same location corresponding to system III longitude, about 62 degrees latitude and 174 degrees longitude. The field line tracing from the ionosphere to magnetosphere based on VIP4 model, which was used to map the auroral emission in ionosphere to the origin of auroral particles in magnetosphere, showed that the mapping region ranging approximately between 80-90 RJ. Moreover, the Michigan Solar Wind Model, MsWim, which is developed at the University of Michigan, showed that on May 13th 2007 solar wind speed built up nearly at the time we found a bright spot. As a result, the possible explanation for this behavior could be the effect by the increasing of solar wind dynamic pressure. In addition the brightening cycle of bright spot suggests the possibility of growth and relaxation states similar to the behavior of Earth's aurora.

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