

## Vertical emissivity profiles of Jovian northern H3+ and H2 infrared auroras observed by Subaru/IRCS in Dec 2011 (and Feb 2014)

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We resolved the vertical emissivity profiles of H3+ overtone, H3+ hot overtone, and H2 emission lines of the Jovian northern auroras in K-band obtained in December 2011 observed by the IR Camera and Spectrograph (IRCS) of the Subaru 8.2 m telescope with the adaptive optics system (AO188). It was not the simultaneous observation with Hisaki/EXCEED. The observation was done in December 2011. However, it is related to Fujisawa et al. in this session, so that we present the results as a linked presentation. Following observation was done in Feb 2014, during the Hisaki/EXCEED coordinated campaign. We try to compare the result of this new chance with this report.

The spatial resolution achieved was  $\sim 0.2$  arcsec, corresponding to  $\sim 600$  km at Jupiter.

We derived the vertical emissivity profiles at three polar regions close to the Jovian limb. The H3+ overtone and H3+ hot overtone lines had similar peak altitudes of 650-1000 km and 550-1050 km above the 1 bar level, which were 350 km and 100-600 km lower, respectively, than the model values. On the contrary, the H2 peak emission altitude was high, 700-950 km above the 1 bar level. It was consistent with the value expected for precipitation of  $\sim 1$  keV electron, which favors a higher altitude emissivity profile.

We concluded that the lower peak altitudes of H3+ overtone and hot overtone lines were caused by the non-local thermodynamic equilibrium (non-LTE) effect stronger than the model assumption. We could reproduce the observational emissivity profiles from the model by including this effect. It has been proposed that neutral H2 and ionized H3+ emissions can have different source altitudes because of their different morphologies and velocities; however, our observed results with a general circulation model (GCM) show that the peak emission altitudes of H3+ and H2 can be similar even with different velocities.

In the observation of Feb 2014, we could get the vertical profile of southern aurora with the AO188 activation. The tentative result supported the conclusion of the result in the 2011 observation in the northern hemisphere. We will also report the comparison with this new result.