

## Venus upper atmosphere as observed by Hisaki: Dayglow and ion tail

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Hisaki was launched on September 14, 2013. Since then, we have conducted quasi-continuous observations of the upper atmosphere of Venus by using the Extreme Ultraviolet Spectroscope for Exospheric Dynamics (EXCEED) [Yoshioka *et al.*, 2013; Yoshikawa *et al.*, 2014] on-board Hisaki. Our observation aims to see variations of the EUV dayglow of Venus and to detect ions, such as O<sup>+</sup> and C<sup>+</sup>, escaping from Venus.

From three quasi-continuous observations in 2014, we found characteristic periodic variations of oxygen EUV dayglow [Masunaga *et al.*, 2015]. In 2015, we conducted new observations of Venus upper atmosphere covering different local times or different latitude from those in 2014. Our result shows that the ~4 day periodicity is observed on the dawn side of Venus. We suggest that gravity waves may propagate from the middle atmosphere of Venus, where the atmosphere is super-rotating with a 4-day period, to the upper atmosphere of Venus. The local time difference of the ~4-day periodicity of the dayglow suggests that there is a local time difference in wave propagation altitudes or wave filtering structures.

Using the 10" slit of EXCEED, we also observed Venus tail region to detect ion tail escaping from Venus. The 10" slit has a better pointing accuracy than that of the 60" slit. The result shows that C<sup>+</sup> ion tail (CII 133.5 nm) is detected with SNR > 1. We discuss the escape rate of C<sup>+</sup> ions from Venus by assuming cold C<sup>+</sup> ions are escaping from Venus.

Keywords: Hisaki, EXCEED, Venus, Dayglow, Ion escape