# Venus nightside infrared spectroscopic study around the 2.3-$\mu$m $CO_2$ atmospheric window using IRTF/SpeX data in Jan-Feb 2017

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Venus has a 96.5% $CO_2$ atmosphere with 20-km thick $H_2SO_4$ clouds at 48-70 km altitudes above surface covering the entire planet. The strong $CO_2$ absorption effectively hinder thermal emission from lower atmosphere to space, and the clouds also contribute the opacity. However, there are well-known atmospheric windows which allow us to detect the emission below the clouds. We observed Venus nightside using such a channel around 2.3 $\mu$m. The observation was conducted at IRTF, Hawaii, USA, for 15 days in Jan and Feb 2017. As Venus approaches its inferior conjunction in March 2017, the apparent size of Venus increased from 22" to 38" during our observation period. We used a medium resolution spectrometer (SpeX, R~2500 in the 1.68-4.2 $\mu$m range), which has sufficient resolving power to study cloud opacity at 48-55 km, as well as spatial distributions of trace gases such as CO, OCS, $H_2O$, $SO_2$ below the clouds at 30-40 km altitudes above surface. This observation was conducted as a coordinated observation with the Japanese Venus mission, Akatsuki, which monitors atmospheric winds and mesospheric $SO_2$ abundance above the clouds. We will compare the trace gaseous spatial distributions below and above the clouds, and investigate their possible correlation.

Keywords: Venus, Infrared, Spectroscopy, Ground-based observation

 