R009-16
B 会場 ：11/24　PM2 （15:30-18:15）
17:30〜17:45

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Influence of the solar wind on the hydrogen airglow in the Venusian upper atmosphere observed by Hisaki

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Variations in the Venusian hydrogen atmosphere are important for understanding the dynamics of the upper atmosphere, such as atmospheric escape. Observations from Venus Express have shown the presence of hot and cold components in the Venusian hydrogen corona at different scale heights. It was suggested that charge exchange between the cold component and ionospheric or solar wind protons plays a significant role in producing the hot component (Chaufray et al. 2012). However, the temporal variation in the two hydrogen components and the influence of the solar wind on them have not been fully understood. We analyzed the variations in global hydrogen column densities, calculated from the brightness of resonantly scattering Ly-α (121.6 nm) and Ly-β (102.6 nm) observed by Hisaki, the solar wind velocity by ASPERA-4 on Venus Express and the solar UV irradiance at Ly-α and Ly-β obtained from Flare Irradiance Spectral Model (FISM) for Planets. The analysis periods were from March 7th to April 3rd, 2014 (P1) and from April 25th to May 23rd, 2014 (P2). High-speed solar wind arrivals were confirmed in P1 but not in P2. In P1, when the high-speed solar wind arrived, the hydrogen column density derived from Ly-α increased by approximately 10% over a few days, and then remained almost constant for weeks. The column density derived from Ly-β decreased slightly during this period. In contrast, in P2, the column density remained almost constant for both Ly-α and Ly-β. One possible explanation for the ˜10% variations in Ly-α and the slightly decrease in Ly-β seen in P1 is an increased high-altitude hot hydrogen abundance due to charge exchange and momentum transfer between neutral hydrogen and ionospheric ions. We considered the charge exchange between thermospheric hydrogen and ionospheric ions as a production process and the charge exchange between hot hydrogen and the solar wind as a loss process and estimated their reaction time scales. We found that these scales are consistent with the observed variation. Another candidates is an increase in the low-altitude cold hydrogen abundance or an increase in hydrogen temperature. We will discuss how we could consider the hydrogen density and temperature variations in the Venusian upper atmosphere.