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OBSERVATION CAMPAIGN OF THE VENUS DAY-SIDE DISK CONDUCTED IN 2020: OUTCOMES AND FUTURE PERSPECTIVE

Yeon Joo Lee, yjlee.msg@gmail.com

Institute for Basic Science, Daejeon, Korea

Venus dayside observation team

Antonio García Muñoz, Atsushi Yamazaki, Eric Quémerais, Stefano Mottola, Stephan Hellmich, Thomas Granzer, Gilles Bergond, Eulalia Gallego, Jean-Yves Chaufray, Rozenn Robidel, Go Murakami, Kei Masunaga, Murat Kaplan, Orhan Erece, Ricardo Hueso, Petr Kabáth, Agustín Sánchez-Lavega, Myung-Jin Kim, Alexis Smith, Valeria Mangano, Thomas Widemann, Ko-ichiro Sugiyama, Shigeto Watanabe, Manabu Yamada, Takehiko Satoh, Masato Nakamura, Masataka Imai, Juan Cabrera, Heike Rauer

We performed a unique Venus observation campaign to measure the disk brightness of Venus over a broad range of wavelengths in August and September 2020. The primary goal of the campaign is to understand better the absorption properties of the mysterious unknown absorber in the clouds. The secondary goal is to extract a disk mean SO₂ gas abundance, whose absorption spectral feature is entangled with that of the unknown absorber at the ultraviolet (UV) wavelengths. A total of 3 spacecraft and 6 ground-based telescopes participated in this campaign, covering the 52 to 1700 nm wavelength range. After careful evaluation of the observational data, we could utilize the data sets acquired by 4 of these facilities. We accomplished our primary goal by analyzing the reflectivity spectrum of the Venus disk over the 283-800 nm wavelengths. Considerable absorption due to the unknown absorber is present in the 350-450 nm range, and we retrieved the required optical depth by the unknown absorber. The result shows a consistent wavelength dependence of relative optical depth with that at low latitudes during the Venus flyby by MESSENGER in 2007 (Perez-Hoyos et al. 2018). Last, we summarize the experience obtained during this first campaign, which should enable us to accomplish our second goal on future campaigns.

References: Pérez-Hoyos et al. 2018, JGR (Planets), 123, 145, doi:10.1002/2017JE005406