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Reflectivity of Venus's Dayside Disk During the 2020 Observation Campaign: Outcomes

and Future Perspectives. Yeon Joo Lee^{1,2}, Antonio García Muñoz³, Atsushi Yamazaki^{4,5}, Eric Quémerais⁶, Stefano Mottola¹, Stephan Hellmich^{1,7}, Thomas Granzer⁸, Gilles Bergond⁹, Martin Roth⁸, Eulalia Gallego-Cano¹⁰, Jean-Yves Chaufray⁶, Rozenn Robidel⁶, Go Murakami⁴, Kei Masunaga⁴, Murat Kaplan¹¹, Orhan Erece¹¹, Ricardo Hueso¹², Petr Kabáth¹³, Magdaléna Špoková^{13,14}, Agustín Sánchez-Lavega¹², Myung-Jin Kim¹⁵, Valeria Mangano¹⁶, Kandis-Lea Jessup¹⁷, Thomas Widemann¹⁸, Ko-ichiro Sugiyama¹⁹, Shigeto Watanabe²⁰, Manabu Yamada²¹, Takehiko Satoh⁴, Masato Nakamura⁴, Masataka Imai²², and Juan Cabrera¹

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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 investigate the absorption properties of the 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 three spacecraft and six ground-based telescopes participated in this campaign, covering the 52 to 1700 nm wavelength range. After careful evaluation of the observational data, we focused on the data sets acquired by four facilities. We accomplished our primary goal by analyzing the reflectivity spectrum of the Venus disk over the 283-800 nm wavelengths. Considerable absorption is present in the 350-450 nm range, for which we retrieved the corresponding optical depth by the unknown absorber. The result shows a consistent wavelength dependence of the relative optical depth with that at low latitudes during the Venus flyby by MESSENGER in 2007 [1], which was expected because low latitudes dominate the overall disk reflectivity. Our experience obtained during this first campaign should enable us to accomplish our second goal in future campaigns, which will be introduced in our presentation.

References: [1] Pérez-Hoyos, S., Sánchez-Lavega, A., García-Muñoz, A., et al. 2018, *J. Geophys. Res. (Planets)*, 123, 145, doi: 10.1002/2017JE005406