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Interannual Variability of Venus Albedo as Inferred from LASCO C3 Data

SATOH, Takehiko[1*] ; ENOMOTO, Takayuki[2] ; SATO, Takao M.[1]

[1]JAXA, [2]SOKENDAI

Venus albedo in 4 bands (B, V, R, and IR) is measured in ”superior conjunction” transits within LASCO C3 field of view. The data are available for 15 year period (1996-2011). The study is motivated by our recent finding of difference between 2 phase curves of Venus at small phase angles (Satoh et al., 2015; Mallama et al., 2006). The advantage of LASCO data is, needless to say, it is free of scattered light by the earth atmosphere to observe objects near the sun. With the field of view of LASCO C3 (30 R_{sun}), up to 11 degrees phase angle of Venus can be studied.

Because Venus is too bright for nominal exposure time of LASCO (a few hundred seconds for faint coronae), the images of Venus is highly overexposed, resulting in saturation and blooming in the direction of charge transfer in CCD. We have developed a method to integrate such signals and evaluated its accuracy by measuring the brightnesses of stars (Aldebaran and Antares in IR). Measured star flux is found to be stable at the level of +/- 10 %, which is quite good as red-giants exhibit similar magnitude of pulsation.

In Venus data, we have found that brightness in IR seems to have changed between 2003 and 2005 transits. The data in 1996-2003 are systematically ˜20 % brighter than the data in 2005-2011. It is noteworthy that Mallama et al.’s phase curves include the data from the former and Satoh et al.’s phase curves are in 2011 (the period of latter group). Details of data analysis and possible cause of such change will be discussed.

Keywords: Venus, Albedo, Interannual variation, SOHO, LASCO, C3