

Enormous cloud cover as seen by Akatsuki/IR2 on the night-side disk of Venus

*Takehiko Satoh^{1,2}, Choon Wei Yun², Takao M. Sato³, Takeshi Horinouchi⁴, George HASHIMOTO⁵, Kevin McGouldrick⁶

1. Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency, 2. Department of Space Science, SOKENDAI, 3. Department of Business and Information Systems, Hokkaido Information University, 4. Faculty of Environmental Earth Science, Hokkaido University, 5. Department of Earth Science, Okayama University, 6. LASP, University of Colorado Boulder

Night-side observations in transparency windows of CO₂ atmosphere of Venus allow visualizing inhomogeneous clouds in ~50 to ~60 km altitudes. The IR2 camera on board Akatsuki captured such images at 1.735, 2.26, and 2.32 μ m wavelengths. In the IR2 night-side data, an enormous cloud of greater opacity and very sharp edge in the front (western end) is seen repeatedly. This feature seems to encircle the planet with a period of ~4.5 days (Peralta).

Although interesting, property of particles in this feature was not studied before due to difficulty of photometric measurements in IR2 night-side data. This difficulty comes from a combination of the intense day crescent and extended tail of IR2 point-spread function (multiple reflection in the detector is the cause). We have developed a technique to restore the contrast of the night-side data by deconvolution so that the photometric studies can be done with IR2 night-side data.

The data acquired on 18th and 27th August 2016 are analyzed. We have performed a series of radiative transfer computations to reproduce both 1.735- and 2.26- μ m opacities in this enormous cloud. Properties of the cloud particles will be presented and possible mechanism of this remarkable phenomenon will be discussed.

Keywords: Akatsuki IR2, Venus night-side, Cloud opacity