

EVOLUTION OF NIGHTSIDE FEATURES FROM DECONVOLVED AKATSUKI IMAGE SEQUENCES AT 1.74, 2.26 AND 2.32 μm . E. F. Young¹, S. Ali-Zade², K. M. Aye³, M. A. Bullock⁴, C. Cantrall³, T. Satoh⁵, C. W. Yun⁵, and S. A. Vierling², ¹Southwest Research Institute, 1050 Walnut St, Boulder, CO 80304, efy@boulder.swri.edu, ²Amherst College, Amherst, MA 01002, ³University of Colorado/LASP, 1234 Innovation Dr., Boulder, CO 80303, ⁴Science and Technology Corp. 21 Enterprise Parkway, Suite 150 Hampton, VA 23666-6413, ⁵Institute of Space and Astronautical Science, JAXA 3-1-1 Yoshinodai, Chuo-ku, Sagami-hara-shi Kanagawa 252-5210, Japan

Introduction: The IR2 camera on the Akatsuki spacecraft obtained images of Venus throughout most of 2016 with three filters (1.74, 2.26 and 2.32 μm) designed to image clouds on Venus's nightside. We present a set of images obtained on 25-AUG-2016 that is remarkable for two reasons. First, it consists of sequences of 19 images in each filter, spanning an 18-hr period with a 1-hr cadence. Second, each image has been deconvolved with a modeled PSF to remove scattered daylight near the terminator and improve the spatial resolution.

We present cloud-tracking results based on careful registration of the limb in each image. The high spatial resolution lets us recover cloud motions with velocity errors less than 1 m/s.

This particular day of observations show some unusual clouds that appear to boil into existence during the image sequence. We present cloud tracking data for these features that suggests a different altitude than other cloud features in the immediate vicinity.

Disk Registration: Although disk registration may seem like a trivial task, it is, in fact, the major source of error in estimating cloud motion velocities. We show results from a robust limb gradient fitting technique that locates Venus's limb at the 5 km level (rms).

Cloud Tracking: We use a cloud-tracking method based on the cross-correlations of the gradients of IR2 images [1]. In addition, we adapt the Advection Correction method of [2] to fit cloud motions with functional forms over periods of several hours. The resulting velocity fields are accurate enough to show meridional motions and local vorticities.

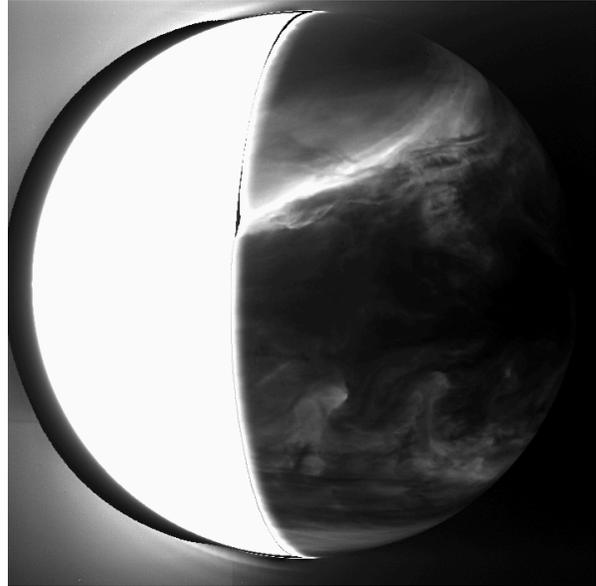


Fig. 1. An Akatsuki/IR2 2.26 μm image of Venus from 25-AUG-2016 04:02 UT.

References: [1] Nara, Y. et al. (2020) *JGR*, 125, Issue 3, article id. e06192. [2] Asay-Davis, X. S. et al. (2009) *Icarus*, 209, 164-188.