



## **Zonal winds in Venus's lower and middle cloud decks from IRTF observations**

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We report on 31 nights of groundbased infrared observations of Venus made between May 2001 through February 2006. The observations include IRTF images obtained at 2.26 and 2.15 microns (the SpeX cont-K and Br-gamma filters, respectively), which represent a window and a continuum region for thermal photons emitted by Venus's surface and lower two scale heights. Selected images from most nights have seeing in which the full-width at half-maximum (FWHM) is 0.5 arcsec or better, or 120 to 150 km per FWHM resolution element. The subobserver latitude is usually a few degrees from Venus's equator, providing a pole-to-pole view of Venus that complements the VIRTIS IR images of the south pole. An upcoming observing run is scheduled for 20-31 July 2007; it is intended to provide image sets that will be combined with VIRTIS images to build composite maps of Venus from the south pole to at least 60 N.

We report on the velocities of features that are tracked over periods of 40 minutes to 3 hours. The latitudinal zonal wind profiles are compared to previous work. Among other results, we find that the average horizontal wind in our field of view is 20 percent slower on two consecutive days (July 12 and 13, 2004) than the usual period of about 6 days that has been previously reported. We present new algorithms for tracking features and provide applications for coregistering images and calculating vector maps for a pair of images.