

More evidence (or lack thereof) of planetary-scale waves manifested in Venus' lower and middle cloud decks

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For nearly a decade, several teams of investigators have observed Venus near its inferior conjunctions. On Venus' night side, clouds in the lower and middle cloud decks show up as silhouettes against the thermal emission from the surface and lower few scale heights. We have tracked these clouds to use them as proxies for wind vectors in the altitude ranges of the lower and middle cloud decks (around 45 to 55 km). Our initial motive was to measure winds to look for structure in latitudinal wind profiles (as has been done by Carlson *et al.* 1991, Crisp *et al.* 1991; Sanchez-Lavega *et al.* 2008; Moissl *et al.* 2009), but we were surprised to find evidence suggesting a planetary-scale wave with an ~8-day period (Young *et al.* 2008). Smaller scale wave phenomena have been resolved by VIRTIS cameras and reported (Peralta *et al.* 2008)

During 10 consecutive morning observations from July 4 - July 13, 2004, we measured the median cloud velocities near the equator (between -20 to +20 degrees). These velocities were bimodal, either "slow" (around 53 - 55 m/s) or "fast" (64 - 66 m/s). For this particular observing run, there were two "fast" days (July 4 & 5), followed by seven "slow" days (July 6 - 12), and another "fast" day (July 13). This sequence suggests a planetary wave with an 8 - 10 day period, but it is important to verify and characterize these waves with observations that span more than a putative wavelength.

On two occasions we observed Venus before and after inferior conjunction, skipping 6 - 9 weeks when Venus was too close to the Sun for us to observe from the IRTF telescope: May 4 - 10 with July 4 - 13, and July 20 - Aug. 1 with Sep. 7 - 16. Here we will report on our efforts to find/characterize planetary-scale waves from longer baseline data sets, and on plans for a coordinated near-IR campaign after the Oct. 29, 2010 inferior conjunction.

Carlson *et al.* 1991, *Science* **253**, 1541 - 1548.

Crisp *et al.* 1991, *Science* **253**, 1538 - 1541.

Moissl *et al.* 2009, *JGR* **114**, E00B31.

Peralta *et al.* 2008, *JGR* **113**, E00B18.

Sanchez-Lavega *et al.* 2008, *GRL* **35**, L13204.

Young *et al.* 2008. *BAAS* **40**, 513.