Variability of the Venus Oxygen Airglow

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We have obtained spatially resolved near-IR spectroscopic observations of the night-side of Venus through the last three inferior conjunctions using IRIS2 on the Anglo-Australian 3.9m telescope and CASPIR on the 2.3m ANU telescope. The data are used to investigate the extreme variability of the spatial distribution and intensity of the O\(_2\) airglow emission feature at 1.27 microns. The airglow emission was very strong in September 2002, and much weaker in July 2004. Substantial night-to-night variations are also seen in both the intensity and spatial distribution of the emission. The emission is typically brightest near the anti-solar point, consistent with an upper atmosphere circulation in the form of a tidal flow from day-side to night-side. However, there are substantial variations from this typical pattern, with plumes of emission sometimes extending over long distances, and reaching regions close to the terminator. The Venus O\(_2\) airglow provides a probe of the chemistry and dynamics of the Venus upper atmosphere. These and earlier ground-based observations help to provide context for the more detailed studies that will be possible by the Venus Express spacecraft.