

Winds on Titan: Update on the Huygens Doppler Wind Experiment

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Earth-based radio telescopes tracked the Huygens radio signal during its mission at Titan on 14 January 2005. The received frequency was recorded in support of the Huygens Doppler Wind Experiment (DWE) in order to derive a separate component of the probe velocity in addition to the component being measured on the Cassini orbiter. The DWE instrumentation, consisting of ultra-stable oscillators in the transmitter on the Huygens probe and in the dedicated receiver on the Cassini orbiter, were implemented in one of the redundant radio channels in order to maintain the high Doppler stability required for a determination of probe horizontal motion during the atmospheric descent. Due to a receiver configuration error on the Cassini orbiter, all data on one channel, including the DWE measurements and probe telemetry, were lost. The primary DWE science goals, however, could be largely recovered from the successful radio tracking campaign on Earth. An updated vertical wind profile on Titan, based on data with the highest possible temporal resolution, has been constructed under the reasonable provision that the meridional wind is small. Evidence for the planetary boundary layer may be found in the high vertical resolution wind profile near the surface.