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Huygens Probe In-Situ Measurements : An Update

Ralph D. Lorenz
JHU Applied Physics Lab, Space Department, Laurel, United States (ralph.lorenz@jhuapl.edu)

The global Titan perspective afforded by ongoing Cassini observations, and prospects for future in-situ exploration, have prompted a re-examination of Huygens data, yielding a number of recent new results.
Gravity waves have been detected (Lorenz, Ferri and Young, Icarus, 2014) in the HASI descent temperature data, with $\sim$2K amplitude. These waves are seen above about 60km, and analysis suggests they may therefore be controlled by interaction of upward-propagating waves with the zonal wind field.
A curious cessation of detection of sound pulses by a Surface Science Package ultrasound instrument about 15 minutes after the probe landed appears to be best explained (Lorenz et al., Planetary and Space Science, 2014) by an accumulation of polyatomic vapors such as ethane, sweated out of the ground by the warm probe. Such gases have high acoustic attenuation, and were independently measured by the probe GCMS.
The Huygens probe carried two radar altimeters. While their principal function was merely to trigger observation sequences at specific altitudes on the science instruments, the surface range history, and the Automatic Gain Control (AGC) housekeeping data, provide some useful information on Titan's surface (Lorenz et al., submitted). Small-scale topographic variations, and the surface radar reflectivity characteristics implied by the AGC variation with height, are discussed.
A new integrated timeline product, which arranges second-by-second measurements from several Huygens sensors on a convenient, common tabulation, has been recently archived on the PDS Atmospheres node.
Finally, a troubling discrepancy exists between radio occultation and infrared soundings from Cassini, and Huygens methane and temperature measurements in the lower stratosphere. The interdependence of these parameters will be discussed. In particular the possible role of the assumed probe mass history (depending on the unmeasured ablation from the heat shield) and the assumed zonal wind profile on the recovered temperature profile to these factors is examined. It is noted that the speed relative to the atmosphere in the late part of entry, when the hypersonic entry speed has been largely bled away by drag, is particularly sensitive to assumed winds, and it is in this altitude region where the recovered density (or temperature) profile discrepancy may be highest.