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Further Results from the Huygens Probe GCMS Investigation at Titan

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The Gas Chromatograph Mass Spectrometer (GCMS) was among six instruments carried as science payload on the Huygens Probe entry and descent mission to the Saturnian moon Titan on January 14, 2005. It made the first in situ measurement of the composition of the atmosphere and of gases evolved from the surface. Altitude profiles of major and minor species and isotope ratios were determined.

As work progressed on reducing and analyzing both the science and engineering data sets from Titan and conducting additional laboratory calibrations on the Flight Spare instrument, new results have become available and previously published (Niemann et al., 2005) results have been updated. These include altitude profiles of mole fractions of methane (CH_4) and hydrogen (H_2), and pressure-time profiles of gases evaporated from the surface. The surface gases include methane (CH_4), carbon dioxide (CO_2), cyanogen (C_2N_2), acetylene (C_2H_2), hydrogen cyanide (HCN) and ethane (C_2H_6).

The mole fractions of radiogenic argon 40 (^{40}Ar), primordial argon (^{36}Ar), and the isotope ratios for nitrogen (^{15}N/^{14}N), carbon (^{13}C/^{12}C) and hydrogen (D/H) have been updated to include instrument corrections. The detection threshold of 1×10^{-8} for the heavy noble gases krypton and xenon has remained unchanged. The implications of these measurements will be briefly discussed.

The GCMS Team has tentatively identified a number of other organic molecules evaporated from the surface, which were near or directly at the detection threshold of the instrument and are therefore not considered unique identifications.