

## The Gas Chromatograph Mass Spectrometer (GCMS) Experiment on the Cassini-Huygens Probe: First Results

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The Huygens Probe of the Cassini Huygens Mission entered the atmosphere of the moon Titan on January 14, 2005. The GCMS was part of the instrument complement on the Probe to measure *in situ* the chemical composition of the atmosphere during the probe descent and to support the Aerosol Collector Pyrolyser (ACP) experiment by serving as detector for the pyrolyzation products. Data were collected from an altitude of 146 km to ground impact for a time interval of 2 hours and 37 minutes. The Probe and the GCMS survived the ground impact and collected data for 1 hour and 10 minutes in the near surface environment until signal loss by the orbiter. The instrument collected 5634 mass spectra during the descent and 2692 spectra on the ground over a range of  $m/z$  from 2 to 141. Eight gas chromatograph samples were taken during the descent and two on the ground. This is a report on work in progress. The methane-mixing ratio was found to increase below the tropopause, about 35 km altitude, monotonically toward the surface to levels near 5%. After surface impact a steep increase of the mixing ratio was observed suggesting evaporation of surface condensed methane due to heating by the GCMS inlet heater. The presence of Argon 40 was confirmed. Primordial noble gases were below the detection limit of the instrument. Other hydrocarbons and nitriles were also observed and quantitative evaluation is in progress. Preliminary ratios for the major carbon and nitrogen isotopes were computed from methane and molecular nitrogen measurements.

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