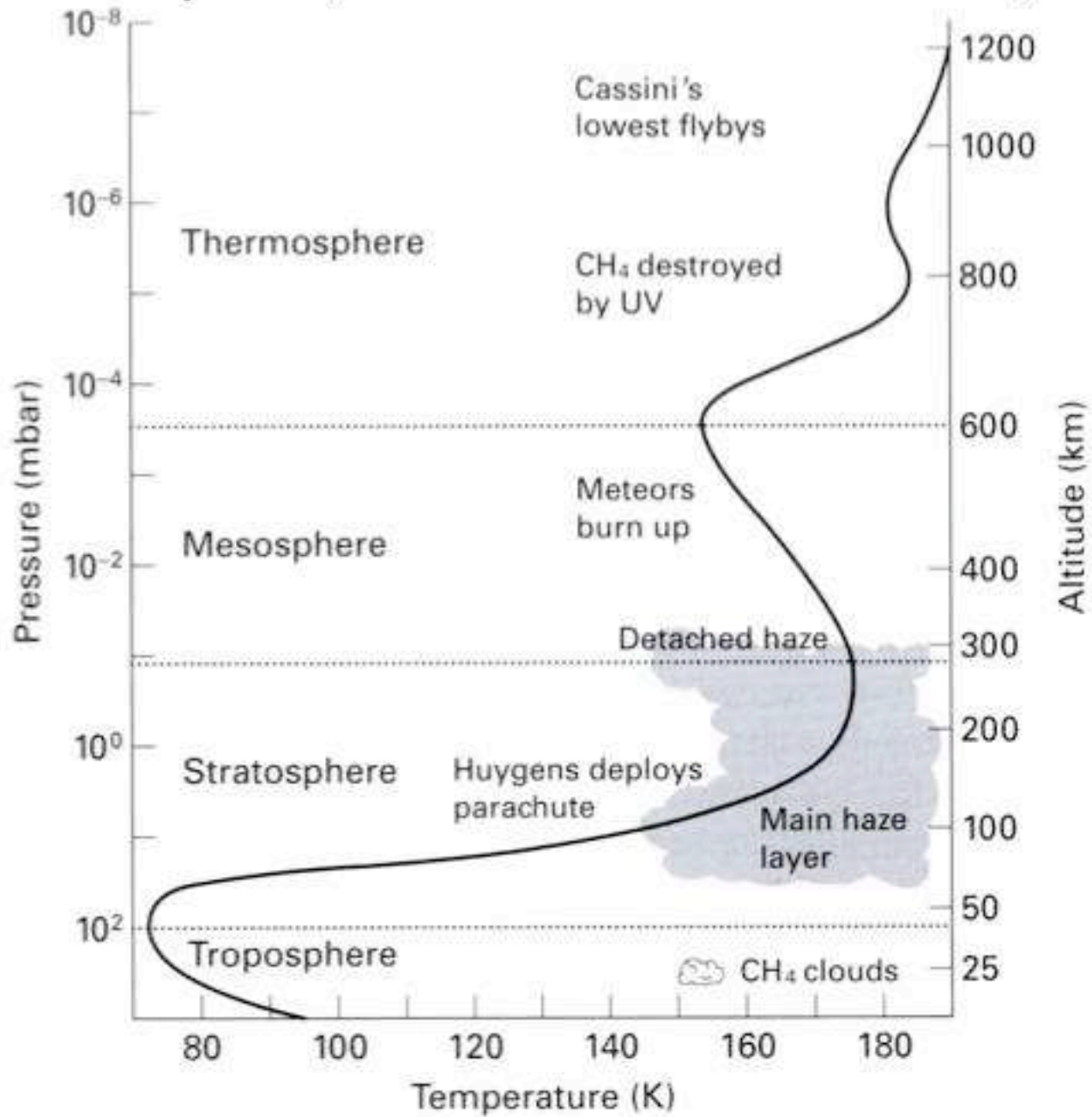


# Observations of Titan's Mesosphere

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Griffith et al. 2005, ApJ, 629, L57

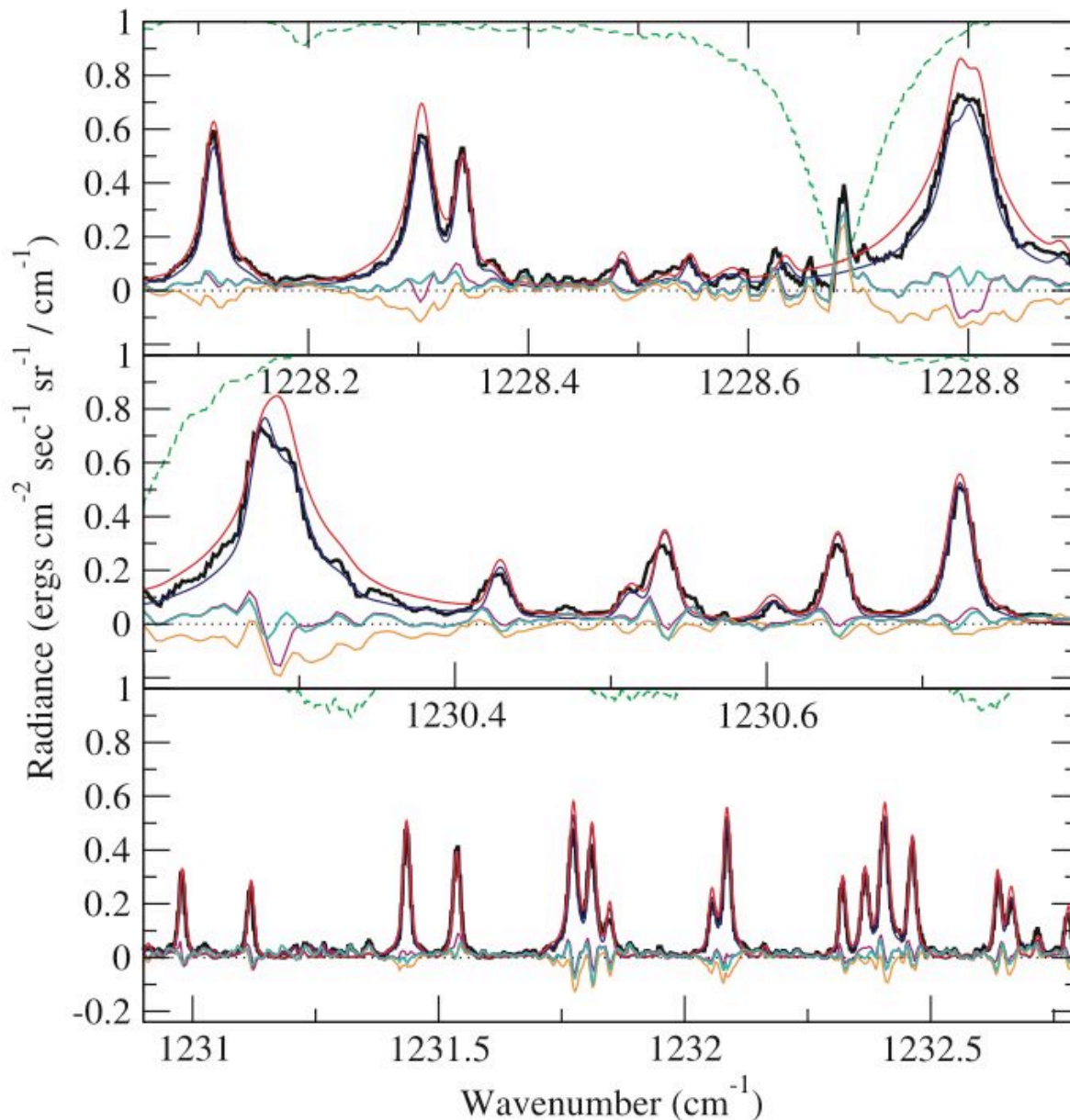


Pressure-temperature plot showing the major components of Titan's atmosphere.

Observations motivated to understanding the heat loading on the Huygens probe as it enters Titan's atmosphere. The heat loading is dominated by the shocked methane gas in front of the heat shield. The harshest conditions occurred near an altitude of about 200 km, where the probe decelerates from high to low Mach numbers.

The high spectral resolution of the TEXES infrared spectrograph allows the methane abundance and temperature to be constrained in the altitude range of 100-600 km.

The results in this paper provides the first infrared measurements of Titan's thermal structure between 300 to 600 km and the detection of Titan's mesosphere. It also provides data for an improved engineering model of Titan's atmosphere for interpretation of the Huygen's probe results.



Black line: Observed spectrum.

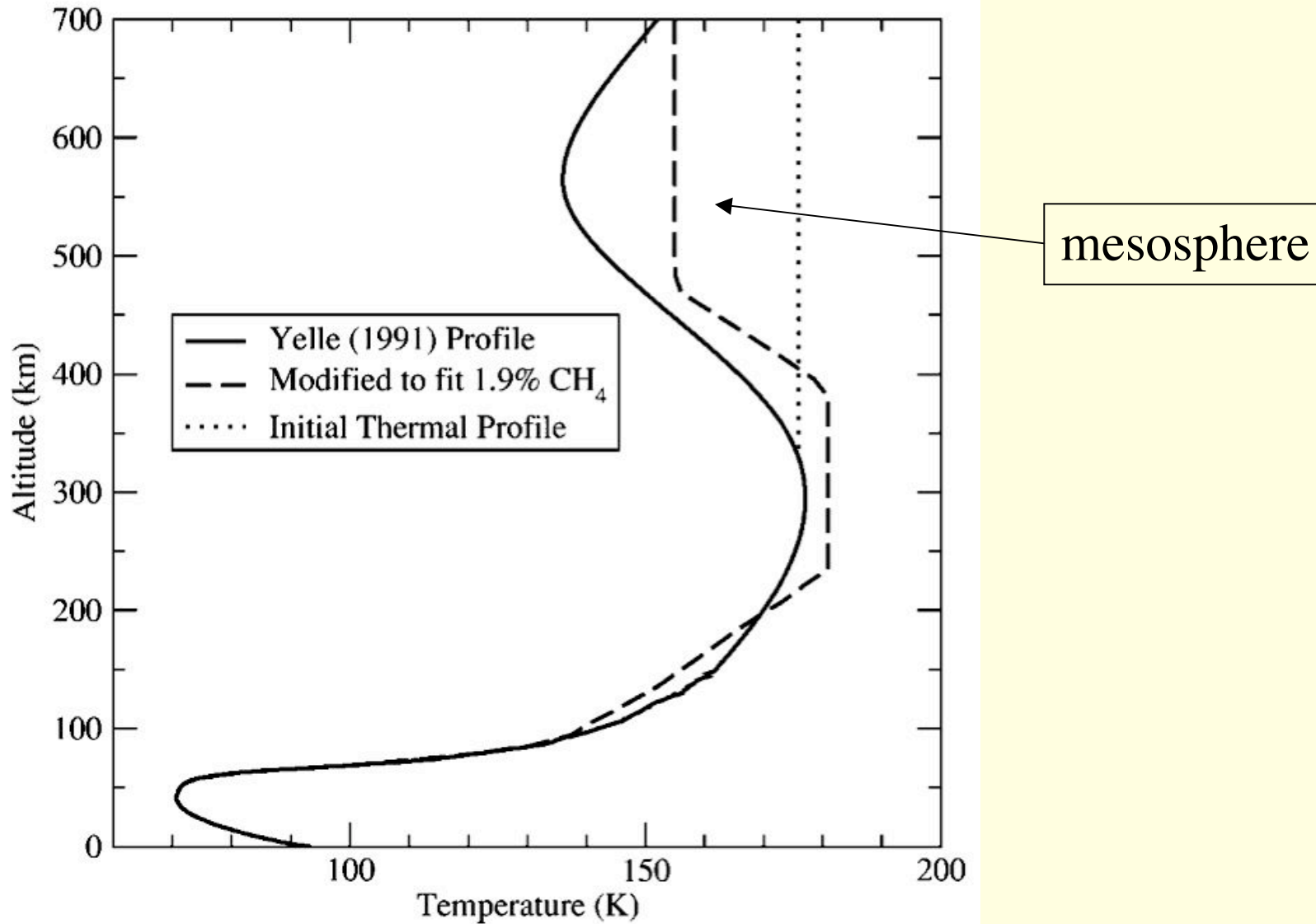
Blue line: Synthetic spectrum with 1.9% methane a best fitting thermal profile.

Red line: Same as blue line but with an initial thermal profile.

Cyan and orange lines: residuals between the observed and model spectra, respectively.

Green line: Atmospheric spectrum.

Spectra produced assuming a mesosphere (blue line) fit the data better than does a mesosphere-free atmosphere (red line).



Initial profile (dotted line) and best fit thermal profile derived from the observations (dashed line), which shows the existence of a mesosphere for the first time.