

Titan's Atmosphere (Clouds and Composition): New Results

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Abstract. Titan's atmosphere potentially sports a cycle similar to the hydrologic one on Earth with clouds, rain and seas, but with methane playing the terrestrial role of water. Over the past ten years many independent efforts indicated no strong evidence for cloudiness until some unique spectra were analyzed in 1998 (Griffith et al.). These surprising observations displayed enhanced fluxes of 14-200% on two nights at precisely the wavelengths (windows) that sense Titan's lower altitude where clouds might reside. The morphology of these enhancements in all 4 windows observed indicate that clouds covered ~6-9% of Titan's surface and existed at ~15 km altitude.

Here I discuss new observations recorded in 1999 aimed to further characterize Titan's clouds. While we find no evidence for a massive cloud system similar to the one observed previously, 1%-4% fluctuations in flux occur daily. These modulations, similar in wavelength and morphology to the more pronounced ones observed earlier, suggest the presence of clouds covering $\leq 1\%$ of Titan's disk. The variations are too small to have been detected by most prior measurements. Repeated observations, spaced 30 minutes apart, indicate a temporal variability observable in the time scale of a couple of hours. The cloud heights hint that convection might govern their evolution. Their short lives point to the presence of rain.

References

Griffith, C. A., Owen, T., Miller, G. A., & Geballe, T. 1998, *Nature*, 395, 575