



Winds and chemistry in Titan's stratosphere and thermosphere from ALMA observations

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We acquired observations of Titan with ALMA in July-August 2016, using three tunings covering portions of the 870 micron atmospheric window. These observations provide imaging of many important species in Titan's atmosphere, including CO, HCN, HC3N and CH3CN and several of their isotopes, HNC, CH3CCH, C2H5CN, C2H3CN and C3H8 at a resolution of up to $\sim 0.15''$ in the N-S direction, equivalent to ~ 1000 km linear resolution at Titan. Selected species (CH3CN, HCN, HNC, DCN and HC3N) were observed with very high spectral resolution, allowing direct wind measurements at different altitudes. Various species show variable spatial distributions in their line emission, from uniform to strongly latitudinally-dependent. Hundreds meter per second winds are measured, suggestive increasing wind speed with altitude. We will present an overview of these data, with emphasis on (i) the vertical profile of winds from stratosphere to thermosphere (ii) the vertical and horizontal distribution of species not observed in the mid-IR by Cassini (HNC, CH3CN, C2H5CN, C2H3CN).