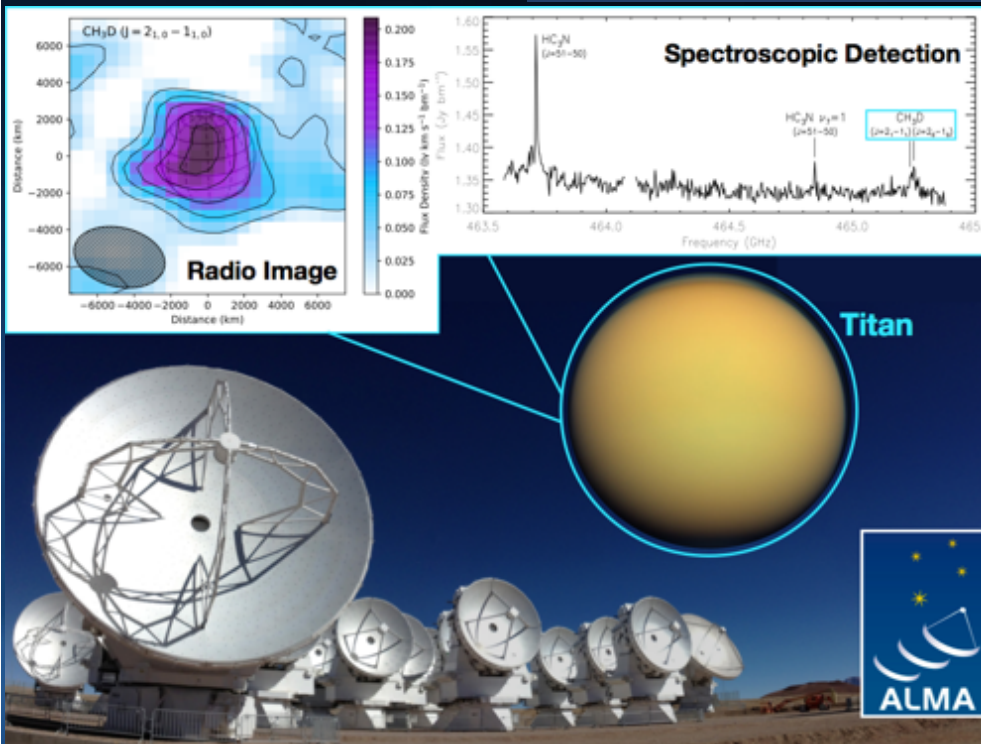


Measuring Titan's Methane from Earth



Ground-based observations following the end of Cassini are helping to answer outstanding questions on the composition and variability of Titan's complex atmosphere.

- Saturn's largest moon, Titan, has a substantial atmosphere mostly composed of methane (CH_4) and nitrogen (N_2). Reactions between these gases and solar radiation create many complex organic trace constituents.
- Titan's atmospheric species vary with latitude and time throughout Titan's ~ 29.5 year seasonal cycle. However, variations in methane are poorly understood, despite its importance in Titan's atmospheric chemistry.

(Bottom) The ALMA telescope in Chile. (Middle) Saturn's largest moon, Titan, as seen from the Cassini spacecraft. (Top left): A radio image of Titan's CH_3D taken with ALMA. (Top right): The submillimeter spectrum of CH_3D .

- An isotope of CH_4 (CH_3D) in Titan's atmosphere was detected using the Atacama Large Millimeter/submillimeter Array (ALMA). This is the first detection of CH_3D at submillimeter wavelengths, and allows for monitoring, and further study, of Titan's global methane distribution, and its seasonal variability in the post-Cassini era and in preparation for future missions to this moon.