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# Estimating the dunes coverage on Titan using VIMS/Cassini hyperspectral camera and RADAR/Cassini SAR swaths

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In order to study Titan's surface, we use the VIMS (Visual and Infrared Mapping Spectrometer) instrument which is able to see through Titan's methane atmosphere in seven spectral windows. VIMS is mainly sensitive to composition and grain size, and has a spatial resolution ranging from 500 m/pixel to several tens of km/pixel. RADAR images give complementary information on the surface: roughness, topography and morphology with a spatial resolution up to 300 m/pixel. In infrared, spectral criteria were used after empirical correction of aerosols in order to map the distribution of heterogeneous units (Le Mouélic et al., 2008) using false color composite images (red as 1.59/1.27-$\mu$m, green as 2.03/1.27-$\mu$m and blue as 1.27/1.08-$\mu$m). We have integrated these data with RADAR data in SAR mode from Ta (October 26th, 2004) to T41 (February 22th, 2008) into a Geographical Information System. The objective is to assess whether infrared units correlate with specific units in RADAR. Several distinct units can be identified in the infrared global maps: dark blue units, very bright features at 5 $\mu$m, white unit, and brown units. We observed in particular that brown units cover 18% of the whole Titan's surface and are found in equatorial regions. Dark blue units cover roughly 2% of Titan's surface. They are systematically associated with bright terrains. The dune fields (located in sand seas) in SAR images generally match the brown infrared terrains: 82% of SAR dunes are located in brown units. Dunes can also be found on dark blue terrains: 4.5% of SAR dunes are in dark blue units, as for example in the regions mapped by Barnes et al. (2007) and Soderblom et al. (2007). From this global mapping, we infer that dunes in the RADAR data are highly correlated with brown infrared terrains, and can overlap dark blue areas. Only 40% of the surface will be mapped by the RADAR at the end of the extended mission in 2010. The global coverage of the surface at medium resolution by VIMS can therefore be used to derive the distribution of dune materials, providing constrains on the total inventory of hydrocarbons on Titan.