Close Window

2010 AGU Fall Meeting

You may print by clicking on this Print *button. To return to the previous page, close this browser window or click the 'X' button in the top right corner of the page.*

ID# P31C-1543
Location: Poster Hall (Moscone South)
Time of Presentation: Dec 15 8:00 AM - 12:20 PM

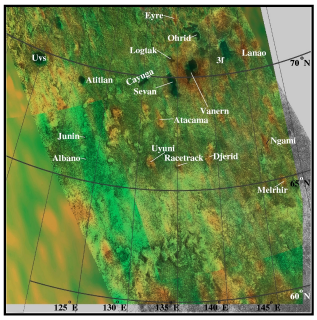
Cassini/VIMS Discovery of Organic Evaporite Deposits in Titan's Dry Lakebeds

J. W. Barnes[1]; J. Bow[1]; J. Schwartz[1, 2]; R. H. Brown[3]; J. M. Soderblom[3, 4]; A. G. Hayes[5]; S. Le Mouélic[6]; S. Rodriguez[7]; C. Sotin[8]; R. Jaumann[9]; K. Stephan[9]; L. A. Soderblom[10]; R. N. Clark[11]; B. J. Buratti[8]; K. H. Baines[12]; P. D. Nicholson[4]
1. Physics, University of Idaho, Moscow, ID, United States.
2. UCLA, Los Angeles, CA, United States.
3. Lunar and Planetary Laboratory, University of Arizona, Tucson, AZ, United States.
4. Astronomy, Cornell, Ithaca, NY, United States.
5. Geological and Planetary Sciences, Caltech, Pasadena, CA, United States.
6. Laboratoire de Planetologie et Geodynamique, Universite de Nantes, Nantes, France.
7. Laboratoire AIM, Centre d'etude de Saclay, Gif/Yvette Cedex, France.
8. Caltech / JPL, Pasadena, CA, United States.
9. Institute for Planetary Research, DLR, Berlin, Germany.
10. USGS, Flagstaff, AZ, United States.
11. USGS, Denver, CO, United States.
12. Space Science and Engineering Center, University of Wisconsin, Madison, WI, United States.

Near-infrared spectral mapping of Titan's north polar lake district from the Cassini Visual and Infrared Mapping Spectrometer (VIMS) during the T69 flyby (2010 June 5) shows numerous, isolated ice-free spectral units. Comparison of the spectral map to RADAR data reveals that many of these units sit at the bottom of empty lakes as identified by the RADAR team. Because not all lakes show the spectral signature, and because nearby terrains and channel beds do not show it either, we interpret these deposits to be evaporites. On Titan, these would form by dissolution of haze or surface material by liquid methane, which then flows into seas and precipitates the solutes out as the methane evaporates. Most of the available soluble chemicals in Titan's environment are organic, thus we expect that the composition of the evaporites is organic as well, though we are as yet unable to make a positive chemical identification. The presence of evaporitic deposits on Titan signifies a critical role for the methanological cycle in transporting and concentrating organic compounds, constrains the formation of Titan's lakes, and suggests that other areas with similar spectral character (Tui and Hotei Regios) could plausibly represent lakebeds as well.

Contact Information

Jason W. Barnes, Moscow, Idaho, USA, 83844-0903, click here to send an email



This is a combined RADAR and VIMS view of the area south of Ligeia Mare on Titan that is to be the subject of the talk. Here in HSV color space VIMS has been assigned hue and saturation, and RADAR is the value. The evaporitic areas appear orange in this view, and many (but not all) correspond to steep-walled empty lakes as seen by RADAR.