A NEW CANDIDATE SAND SOURCE IN TITAN'S EQUATORIAL REGION? S. M. MacKenzie[1] and J. W. Barnes[1], [1]University of Idaho, Moscow ID USA

Introduction: Longitudinal dune fields of organic sands cover most of Titan's equatorial region [Lorenz 2006 Radebaugh 2008, Barnes 2008, Janssen 2009 Rodriguez 2014]. At the end of the Cassini mission, many questions surrounding these landforms remain unanswered, including how sand-sized particles are formed [Barnes 2015].

One possible formation mechanism is the erosion and transport of evaporite from a playa, akin to the gypsum dunes of White Sands National Monument. Evaporite deposits are located across the surface of Titan, including in the interdunes of some dunefields [Barnes 2008, Bonnefoy 2016] and the equatorial basins Tui and Hotei Regio [MacKenzie et al. 2014]. [Barnes et al 2015] looked for spectral similarities between these basins but did not find a correlation with the dune spectra. New observations of Titan's leading hemisphere with the Visual and Infrared Mapping Spectrometer (VIMS) onboard Cassini reveal a new candidate source of evaporite material in Titan's equatorial region (Figure 1).

Methods: We analyze the spectra of the new candidate feature and compare with those of the dune fields using the methods of [Barnes et al 2015] to identify similarities. Methane and trace gas absorption restricts our analysis to the seven wavelength windows at which VIMS can observe the surface of Titan. To address atmospheric effects within the windows (to first order) we apply the empirical correction of [Le Mouelic et al 2012].

However, as demonstrated by [Mackenzie 2016] and hypothesized by [Cordier et al 2015], not all evaporite deposits on Titan are identical in composition (within the resolution of VIMS). We investigate all Cassini observations to look for temporal changes and compare the spectral signatures of this feature with other evaporite deposits, employing the spectral signature identifying techniques of [Clark et al 2003].

Results: Our findings constrain the likelihood of a playa source for Titan sands within the equatorial region. The proximity of source to dunefield would address a lingering problem with the evaporite sand hypothesis: the difficulty of transporting sand from the poles (the location of most evaporite deposits) to the equator (uphill and upwind).

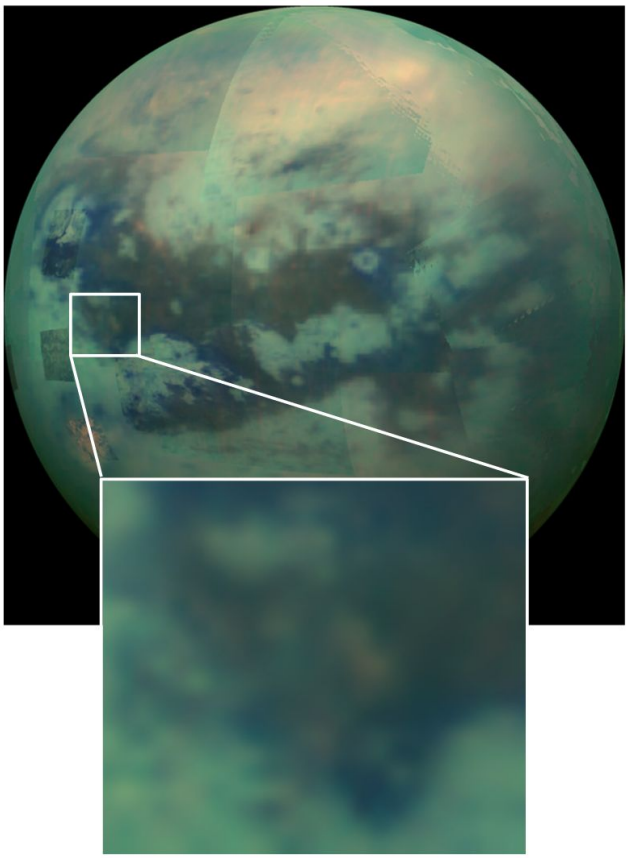

Figure 1: Potential candidate for playa-fed sand formation as seen by Cassini VIMS in November 2015 (T114). Here the VIMS data is colored R=5 um, G= 2 um, and B = 1.3 um; thus, the red color of the feature is consistent with the unique brightness of evaporite deposits at 5 um.

References: [1] Lorenz, R. D. et al. (2006) *Science* 312:5774 [2] Radebaugh, J. et al. (2008) *Icarus* 194:2 [3] Barnes, J.W. et al (2008) *Icarus* 195:1 [4] Le Gall et al. (2011) *Icarus*, 213:2 [5] Rodriguez, S. et al. (2104) *Icarus* 230 [6] Barnes J.W. et al. (2015) *PS, 4:1*. [7] Bonnefoy, L. et al. (2016) *Icarus* 270 [8] MacKenzie, S. M. et al. (2014) *Icarus* 243: 191-207 [9] Le Mouelic et al 2012 [10] MacKenzie, S. M. et al. (2016) *ApJ* 821:1 [11] Cordier, D et al. (2016) *Icarus* 270 [12] Clark, R. N. et al. (2003) *JGRP* 108:E12