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Erosion on Titan

R. Jaumann (1,2), R. H. Brown (3), K. Stephan (1), L. A. Soderblom (4), C. Sotin (5), S. Le Mouélic (5), J. Barnes (3), R. N. Clark (6), B. J. Buratti (7), R. Wagner (1), T. B. McCord (8), S. Rodriguez (5), K. H. Baines (7), D. P. Cruikshank (9), P. D. Nicholson (10), C. A. Griffith (3) and M. Langhans (1)

1 DLR, Institute of Planetary Research. Rutherfordstrasse 2, 12489 Berlin, Germany; 2 Dept. of Earth Sciences, Inst. of Geosciences, Freie Universität Berlin, Germany3 Lunar and Planetary Laboratory, University of Arizona, Tucson AZ 85721, USA; 4 U.S. Geological Survey, Flagstaff, AZ 86011, USA; 5 University of Nantes, 44072 Nantes Cedex 3, France; 6 U.S. Geological Survey, Denver Federal Center, Denver CO 80225, USA; 7 Jet Propulsion Laboratory, California Institute of Technology, Pasadena CA 91109, USA; 8 Planetary Science Institute, 22 Fiddler's Rd., Winthrop WA 98862-0667, USA; 9 NASA Ames Research Center, 245-6, Moffett Field, CA 94035-1000, USA; 10 Department of Astronomy, Cornell University, Ithaca, NY 14853, USA; (ralf.jaumann@dlr.de).

The surface of Titan has been revealed globally by the Cassini observations in the infrared and radar wavelength ranges as well as locally by the Huygens instruments. Dune seas, recently discovered lakes, distinct landscapes and dendritic erosion pattern indicate dynamic surface processes. During Cassini's T20 fly-by the Visible and Infrared Mapping Spectrometer (VIMS) observed an extremely eroded area at 30˚ W, 7˚ S with resolution better than 350 m/pixel. Analyses of the drainage dynamics and comparison with the drainage systems at the Huygens landing site yield high discharge values of the associated channels systems and extreme runoff production rates of 4 to 40 cm/day. In addition, large sandur-like alluvial fans covering ten thousands of square kilometres are discovered at the boundary between high-standing bright and low-laying dark regions. To account for the estimated runoff production and widespread alluvial fan deposits of fine-grained material both frequent recurrence intervals and sudden release of area dependent large fluid volumes are required. Frequent equatorial storms with heavy rainfall of methane and related hydrocarbons might explain this

catastrophic erosion. High-energy flow will cause mechanical weathering and large accumulations of sand in alluvial fans that is picked up by winds to form Titan’s vast equatorial sand seas and dune fields.