

THE DISTRIBUTION OF WATER ICE ON COMET 103P/HARTLEY 2. J. M. Sunshine¹, L. M. Feaga¹, O. Groussin², S. Protopapa¹, M. F. A'Hearn¹, T. L. Farnham¹, S. Besse¹, and the DIXI Science Team. ¹University of Maryland, Department of Astronomy, College Park, MD, USA, 20742 (jess@astro.umd.edu) and ²Laboratoire d'Astrophysique de Marseille, CNRS, and Université de Provence, Marseille, France.

Introduction: The Deep Impact eXtended Investigation (DIXI) flew past comet 103P/Hartley 2 on November 4, 2010 [1]. Near-infrared (1-5 μm) spectra from the HRI-IR instrument [2] were obtained of the nucleus at resolutions up to ~ 25 m/pixel. Multispectral images were also acquired. Strong absorption bands due to water ice are seen both in the coma [1, 3] and in isolated areas on the nucleus. These same areas are also clearly relatively blue in multispectral images. Notably an asymmetry is seen along the terminator, where in inbound images ice is seen on the surface and in outbound images jets are present and ice grains are detected in the coma. The abundance of water ice on the surface of Hartley 2 was determined to help constrain the history of these deposits in relation to the comet's diurnal and seasonal cycles. The HRI-IR spectrometer simultaneously provides information on temperature and thus can be used to infer thermal inertia and roughness. The temperature of the regions with exposed water ice is more than 100 K above the sublimation temperature of water ice (~ 200 K) indicating that the thermal emission is dominated by dust, and that water ice is thermally and physically decoupled from the dust at the scale of observation, with water ice patches at meter and sub-meter scales [4]. These observations of Hartley 2 will be compared to those of 9P/Tempel 1 obtained with the same instrument during the Deep Impact prime mission [5].

References: [1] A'Hearn, M. F., *et al.*, EPOXI at Comet Hartley 2, *Science* 332, 2011. [2] Hampton, D. L., Baer, J. W., Huisjen, M. A. *et al.*, An Overview of the Instrument Suite for the Deep Impact Mission, *Space Science Reviews* 117, 43-93, 2005. [3] Sunshine, J. M., Feaga, L. M., Groussin, O. *et al.*, Icy Grains in Comet 103P/Hartley 2, *42nd Lunar and Planetary Science Conference*, 2011. [4] Groussin, O., Sunshine, J. M., Jorda, L. *et al.*, In-situ thermal observations of the nuclei of comets 103P/Hartley 2 and 9P/Tempel 1, DPS, p. 84, 2011. [5] Sunshine, J. M., A'Hearn, M. F., Groussin, O. *et al.*, Exposed Water Ice Deposits on the Surface of Comet 9P/Tempel 1, *Science* 311, 2006.

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