ANALYSIS OF PYROCLASTIC DEPOSITS WITHIN FLOOR-FRACTURED LAVOISIER CRATER. J.O. Gustafson[1], L.R. Gaddis[2], B.R. Hawke[3], and T.A. Giguere[4]. [1]Dept. Earth & Atmospheric Sciences, Cornell University, Ithaca, NY 14853; [2]Astrogeology Program, U.S. Geological Survey, Flagstaff, AZ 86001; [3]Hawaii Institute of Geophysics and Planetology, University of Hawaii, Honolulu, HI 96822; [4]Intergraph Corporation, Kapolei, HI 96707.

Introduction: Numerous localized pyroclastic deposits have been identified within the pre-Nectarian floor-fractured crater Lavoisier (D=70 km), located in the highlands northwest of Oceanus Procellarum (38.2°N, 81.2°W), as well as adjacent floor-fractured craters Lavoisier F (D=33 km) and Lavoisier H (D=29 km) [1-3]. Recent data from the camera subsystems aboard the Lunar Reconnaissance Orbiter (LRO) and SELENE/Kaguya spacecraft [4-6] enable more detailed analysis of these pyroclastic deposits and associated small effusive deposits. We are using high-resolution monochrome data from the LRO Narrow Angle Camera (NAC; resolution ~0.5-2.0 m/pixel) and the Kaguya Terrain Camera (TC; resolution ~10 m/pixel) to examine deposit morphologies, surface textures, and potential source vents. We are also using multispectral data from the LRO Wide Angle Camera (WAC; two ultraviolet (UV) and five visible (VIS) wavelengths from 320-690 nm; resolution ~400 m/pix in the UV and ~75 m/pix in the visible) and the Kaguya Multiband Imager (MI; five VIS and near-infrared (NIR) wavelengths from 415-1000 nm; resolution ~20 m/pixel) to constrain deposit compositions and to look for differences in mineralogy and/or glass content between deposits.

Our goals for this investigation included not only further characterizing the Lavoisier pyroclastic deposits, but also assessing the efficacy of using the combined LRO and Kaguya camera data in the analysis of localized pyroclastic deposits.

Discussion: A number of pyroclastic deposits are associated with the annular floor fractures visible within Lavoisier, Lavoisier F (southeast of Lavoisier), and Lavoisier H (northeast of Lavoisier). The dark tone of these deposits stands in contrast to the surrounding highlands deposits, as seen in the Clementine multispectral mosaic (Figure 1). Some of these deposits may also contain an effusive component. An LROC NAC mosaic of the deposit along the western wall of Lavoisier reveals a broad irregular depression that could be a source vent, as well as a possible flow lobe (Figure 2). At the edge of the depression and across the possible flow lobe are several smaller, possibly endogenic craters that could be smaller vents. We also plan to examine both the LROC WAC and Kaguya MI multispectral data for these deposits; a single-band image from the Kaguya MI shown in Figure 3 provides an example of level of resolution available from this instrument.

Summary/future work: Our preliminary review of the LROC and Kaguya camera data for Lavoisier indicates that these data will enable a more detailed assessment of extent and characteristics of these deposits than was previously possible. We plan to continue our investigation of Lavoisier crater by examining additional LROC NAC and Kaguya TC images to locate possible source vents, identify likely effusive deposits, and determine the extent and approximate thickness of the pyroclastic deposits. LROC WAC and Kaguya MI multispectral data will be examined to constrain the composition of the deposits and to search for compositional heterogeneity among deposits. Once we have completed this assessment, we plan to extend our analysis to pyroclastic deposits found within other floor-fractured craters across the Moon.

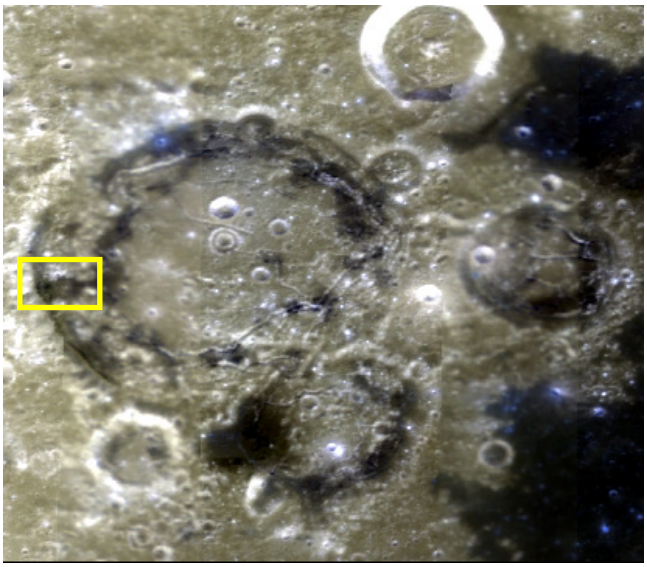

Fig. 1: Clementine multispectral mosaic of Lavoisier Crater. Yellow box indicates location of Figs. 2 and 3. Image width is 110 km (USGS).

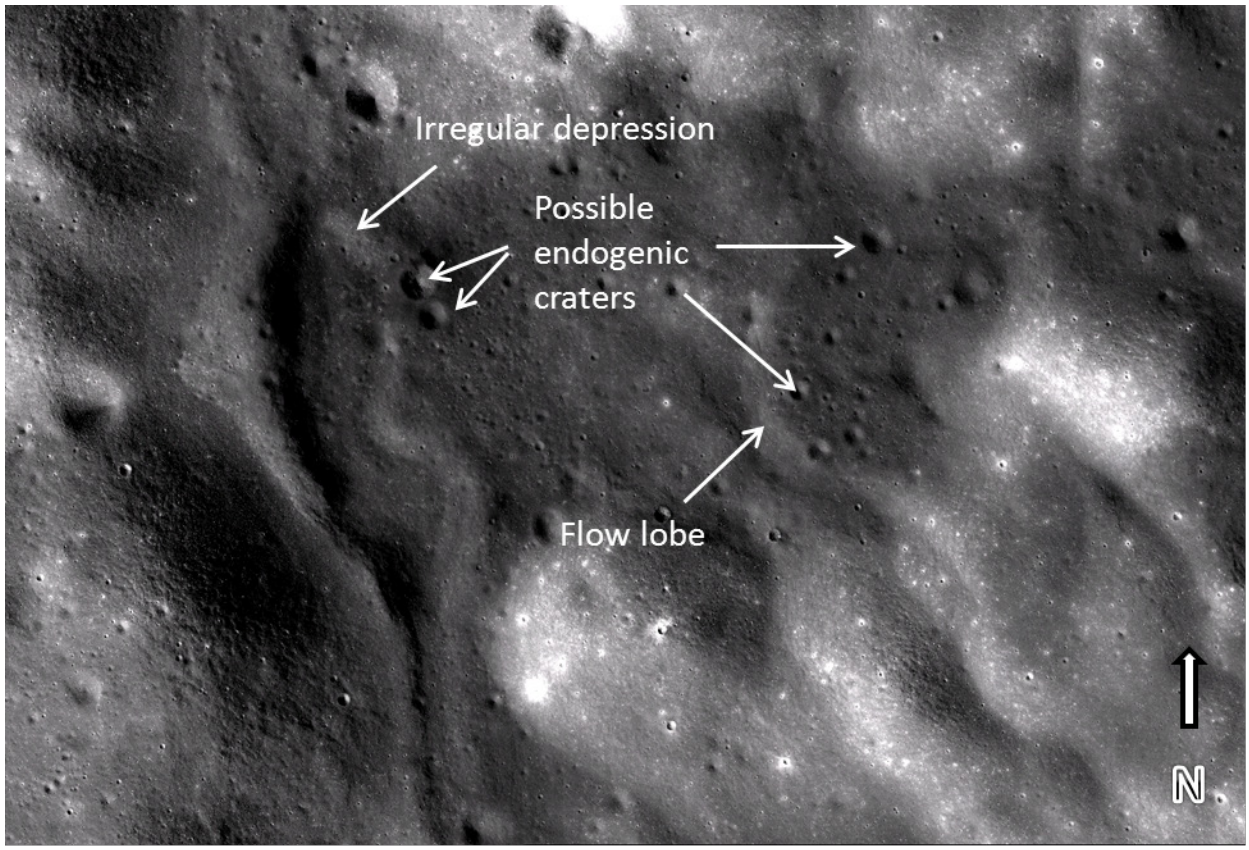

Fig. 2: NAC mosaic of the western edge of Lavoisier crater. Image width is 16 km. NAC image M105055584l/R (NASA/GSFC/ASU).

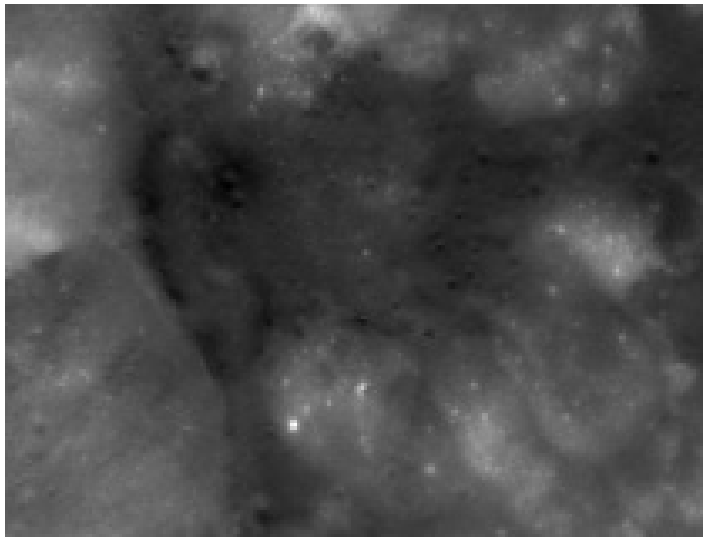

Fig. 3: Single band of Kaguya MI image from the western edge of Lavoisier Crater (JAXA)

References: [1] Schultz, P.H. (1976), *Moon 15*, 241-273. [2] Coombs, C.R. et al. (1993), *PLPSC 23rd*, 249-250. [3] Rosanova et al. (1998), *PLPSC 29rd*, abstract #1710. [4] Robinson M.S. *et al*. (2010) *Space Sci. Rev.* 150, 81-124. [5] Haruyama et al., 2008, Adv. Sp. Res. 42, 310-316. [6] Ohtake et al., 2010, Space Sci. Rev. 154, 57-77.