



Preliminary spectral and geological analyses of the Degas crater on Mercury - supporting the SIMBIO-SYS instrument onboard BepiColombo

Nicolas Bott¹, Océane Barraud¹, and Laura Guzzetta²

¹LESIA - Observatoire de Paris - CNRS - Sorbonne Université - Université Paris-Diderot, 5 place Jules Janssen, 92195 Meudon, France

²Istituto di Astrofisica e Planetologia Spaziali - INAF, Rome, Italy

The BepiColombo spacecraft was launched in October 19th, 2018 (local time) towards Mercury, carrying 16 instruments in two orbiters (MPO and MMO). Among this impressive set of devices, the SIMBIO-SYS (Spectrometer and Imagers for MPO BepiColombo Integrated Observatory SYSTEM) instrument [Cremonese et al., 2020] will map at an unprecedented high resolution the surface of the innermost planet of the Solar system, thanks to 3 cameras: STC (Stereo Channel), a stereo camera; HRIC (High spatial Resolution Imaging Channel), a multispectral camera with a very high spatial resolution; VIHI (Visible Infrared Hyperspectral Imager channel), a hyperspectral imager to with a good spectral resolution and a good S/N ratio. The last one aims to map the global mineralogical composition of Mercury, which has not yet been precisely determined due to the absence of diagnostic absorption bands in the remote sensing data of the previous MESSENGER mission [Izenberg et al., 2014]. The choice and the list of targets SIMBIO-SYS will have to analyse are still in progress and are continuously updated. Therefore, preliminary studies of potential targets of interest can be very useful to support their selection.

For that purpose, we started investigating a particular crater, Degas, which occurs in the Shakespeare quadrangle (H-03) [Guzzetta et al., 2017; Bott et al., 2019], located at mid-latitudes of the northern hemisphere of Mercury (37.08 ° N - 232.66 ° E). Its well-preserved ray system of ejecta are a strong hint in favor of its chronostratigraphic classification as a Kuiperian (-1 Gyr – today) crater [Banks et al., 2017]. By using MESSENGER data, we analysed the Degas crater with a three-fold approach: a multispectral analysis based on MDIS-WAC data have been combined with a spectroscopic analysis of MASCS data and a geological analysis based on MDIS-NAC images. Here, we would like to present the first outputs of our works, including a set of color and monochrome mosaics, spectral parameters maps and spectra of each kind of terrain identified with the mosaics, and the first results of the high-resolution geological mapping of the Degas crater performed on a NAC images mosaic of 23 m/pixel. Other findings and initial discussions will be presented during the virtual talk.

Acknowledgements: This work is partly supported by the Centre National d' Études Spatiales. We gratefully acknowledge funding from the Italian Space Agency (ASI) under ASI-INAF

agreement2017-47-H.0. The authors acknowledge the use of MESSENGER data.