GEOLOGIC MAP OF THE SHAKESPEARE QUADRANGLE (H03), MERCURY. L. Guzzetta[1], V. Galluzzi[1], L. Ferranti[2], and P. Palumbo[3,1], [1]INAF, Istituto di Astrofisica e Planetologia spaziali (IAPS), Rome, Italy (laura.guzzetta@iaps.inaf.it), [2]DiSTAR, Dipartimento di Scienze della Terra, dell'Ambiente e delle Risorse, Università "Federico II", Naples, Italy, [3]Dipartimento di Scienze & Tecnologie, Università degli Studi di Napoli 'Parthenope', Naples, Italy.

Introduction: A 1:3M geological map of the H03 Shakespeare quadrangle of Mercury (Fig. 1) has been compiled through photointerpretation of the remotely sensed images of the NASA MESSENGER mission. This quadrangle, located at middle latitude of the northern hemisphere of the planet, is characterized by the occurrence of three main types of plains materials and four basin materials, pertaining to the Caloris basin, the largest impact crater on Mercury's surface. The geologic boundaries have been redefined compared to the previous 1:5M map of the quadrangle [1] and the craters have been classified privileging their stratigraphic order rather than morphological appearance. Based on the dominant contractional nature of Mercury's tectonics [2, 3], the structures have been interpreted and mapped as thrusts or as wrinkle ridges.

Data and Methods: Mapping was performed on a reference monochromatic basemap of reflectance at 166 m/pixel resolution. A suite of a lower resolution basemaps, useful for their different lighting conditions, and two available DTM's, useful in sectors with non-optimal lighting geometry, were also consulted. The datum adopted is that used in the data sets released by the MESSENGER team, in which Mercury's IAU radius (2439.7 km) is approximated to 2440.0 km. The most suitable projection at middle-latitudes is the Lambert conformal conic, as it reduces area distortions. The geological features were digitized within a geographic information system with a variable mapping scale between 1:300k and 1:600k. Craters were distinguished according to their diameter size in 'small' ($10 \leq D < 20$ km), for which only rim crests were mapped, and 'major' ($D \geq 20$ km), for which also crater materials were mapped and grouped into three morpho-stratigraphic classes (c1-c3) according to their overlapping relationships [4]. The geologic contacts were mapped as 'certain' where they are clear and sharp, or 'approximate' where they are uncertain or gradational. The geologic units were distinguished according to their morphological aspects and following definitions of previous authors [1]. Other geomorphological elements such as 'hollows', crater chains and clusters, light coloured ejecta and bright deposits have also been mapped when their width is ≥ 3 km.

Map description: The intercrater plain (ICP) and smooth plain (SP) materials are the main plain materials of the quadrangle occurring in the eastern and west-central sector, respectively. The intermediate plain (IMP) materials occur only as small patches, mostly in the eastern area of the map. The western sector of the quadrangle is occupied by a portion of the Caloris basin and associated materials, that have been distinguished according to four formations (Caloris Group) termed with official names [5]. Tectonic structures, mapped as thrusts, if they show a relevant break in slope and a sinuous trace, or as wrinkle ridges, if show a less prominent ridge and occur within smooth plain materials and basins, mainly occur in the western sector of the quadrangle. The detected morpho-structures will contribute to better evaluation of past stress states of the planet.

This geologic map can be considered an important support to future advanced local studies and target selection for the scheduled ESA-JAXA BepiColombo mission to Mercury.

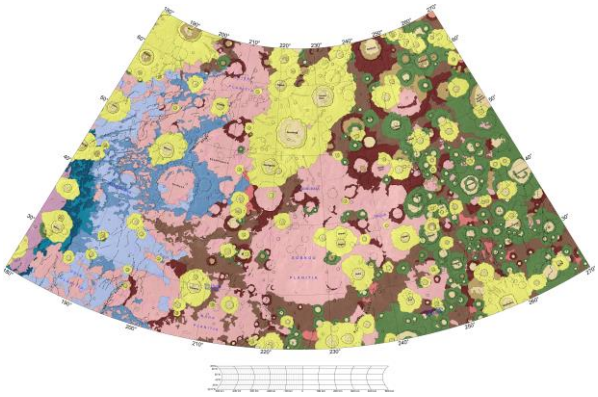

Figure 1. 1:3M geologic map of the Shakespeare quadrangle (H03) of Mercury.

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