KUIPER QUADRANGLE (H06) GEOLOGICAL MAP: INTEGRATION BETWEEN MORPHOLOGICAL AND SPECTRAL CHARACTERISTICS

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Introduction: Kuiper quadrangle (H06) is located at the equatorial zone of Mercury and encompasses the area between longitudes 288°E – 360°E and latitudes 22.5°N – 22.5°S. A detailed geological map (1:3M scale) of the Kuiper quadrangle based on the high resolution MESSENGER data, was performed [1].

The geological map showed that the quadrangle is characterized by a prevalence of crater materials which were distinguished into three classes based on their degradation degree [2]. Different plain units were also identified and classified on the basis of their density of craterisation: (i) intercrater plains, densely cratered, (ii) intermediate plains, moderately cratered and (iii) smooth plains, poorly cratered. This map will be integrated with the spectral information in order to integrate both morphological and spectral characteristics of Kuiper quadrangle's surface.

Data and Method: MDIS (Mercury Dual Imaging System) WAC were used to obtain the multi-spectral map of Kuiper quadrangle. Due to the low latitudes, the data coverage with high spatial resolution is lower than the northern quadrangles [e.g. 3-4] we approach in a multiple-stage passages [5]. This has been done to investigate the region with the best detail from a spectral point of view. Then, we produced an homogeneous 8 color global mosaic at 1600 m/pixel scale (average scale taking into account the average resolution) and at 665 m/pixel pushing the resolution. Moreover, we used partial quadrangle coverage at 385 m/pixel and 246 m/pixel to exploit the presence of higher resolution color images.

Preliminary results: We will show spectral variations considering specific indices and color combinations, discussing the possibility to define some spectral units which could be integrated with the morpho-stratigraphic mapping. Locally will investigate the spectral variation of specific cases, in particular basin floor characterized by different textures, bright regions, fresh craters, hollows, pyroclastic deposits, and some blue dark regions.

This analysis allows us to infer some indications on material composition and permits to produce a more detailed geological map of H06, where morpho-stratigraphic and spectral units are integrated to each other. In this work we will show some example, for areas of interest, of such integrated maps (e.g. Fig.1).

Conclusions: This preliminary analysis highlights that a higher spectral and spatial resolution are needed in order to obtain new information about the landforms'

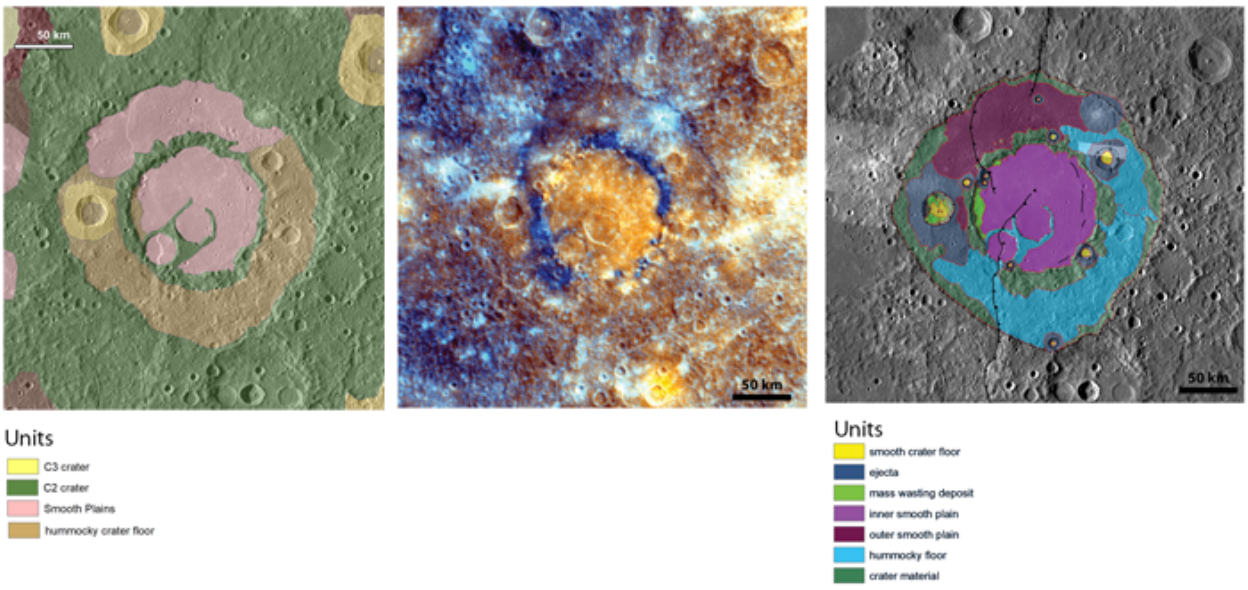

Fig.1 Renoir basin in H06. On the left panel, the morphological map of the basin, as seen in [1]. On the central panel, an enhanced color mosaic of MDIS WAC images (R: PC2; G: PC1; B: 430/1000 μm). On the right panel, the integrated map of Renoir floor taking into account both morphological and spectral characteristics of the surface.

origin. In light of these evidences, it appears that the high resolution of the instruments of BepiColombo mission, like STC and HRIC cameras and VIHI spectrometer of SIMBIO-SYS, can significantly contribute to answer several questions raised during the geological mapping and analysis of the Kuiper quadrangle.

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