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New mapping of Radlandi basin and detailed analysis of its inner plains

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NEW MAPPING OF RADITLADI BASIN AND DETAILED ANALYSIS OF ITS INNER PLAINS.
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Introduction: The Raditladi basin is a large peak-ring impact crater discovered during the MESSENGER (MErcury Surface, Space ENvironment, GEochemistry, and Ranging) first flyby of Mercury in January 2008 [1]. The Raditladi basin is relatively young [2], and the study of the internal structures give an indication of the processes that acted recently in Mercury's geological history.
Geological mapping: We first present the geological mapping of Raditladi crater. In the map we defined different sub-units on the base of previous studies [4][5] and surface morphology and reflectance. Through a GIS software we associated a polygonal layer to each sub-unit, this allowed to distinguish nine different layers.
Due to the similarities with the Rachmaninoff basin, to define sub-units mapped on Raditladi, we adopted Rachmaninoff crater's units definitions made by Marchi et al. (2011) [4].
Structures analysis : We also mapped secondary structures consisting in concentric troughs arranged in a circular pattern. We defined two different kinds of troughs: (i) structures characterized by a distinct flat floor and interpretable as grabens, and (ii) structures with linear and curvilinear segments [5].
Inner plain deposit: The analysis of the topography made possible the estimation of the deposit's thickness. The measurement of the thickness is possible thanks to the presence of two small craters, crater A and crater, located in Raditladi's Inner plain. Observing the morphology of the two small craters' rim and hummocky central floor, we distinguished two different units: the shallower consists in thin material [6] and the deeper consists in shocked surface. To estimate the deposit thickness, we realized two sections across the two craters, we considered the rim uplift due to the stratigraphic doubling [7], and the depth at which we observed the shocked surface situated below the surficial deposit. Moreover the two craters, one near the center and the other near the peak ring, allowed us to observe the variation of the deposit's thickness: tracing a section that cuts both the craters is possible to appreciate its thinning towards the basin center.
On the base of impact crater experiment made by Takita & Sumita (2011) [6] we supposed that the deposit consist in a thin upper layer of material with a fine granulometry.
The deposit thickness measured in the crater B, near the peak ring, is 839 m and in the crater A, near the basin center, is 846 m.
In conclusion, the obtained values, differing only for 7 m, show an approximately constant thickness of the deposit from the basin center, where the values is slightly greater, to the peak ring.
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