

Detailed analysis of Seth's circular niches on comet 67P Churyumov-Gerasimenko

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We performed a detailed geomorphological and spectrophotometric analysis of the circular niches located on Seth region on comet 67P Churyumov-Gerasimenko (67P): they are flat-floored and steep-walled circular depressions present on the Northern hemisphere of 67P (Thomas et al., 2015). The aim is to determine if these features are associated to landslides events or if they are correlated to comet's activity. We selected high resolution OSIRIS images acquired in August 2016 (scale of 31 cm/px) focusing on Seth's niches with unprecedented detail. First, we counted boulders in order to compare the boulders size-frequency distribution of niches with previous results (Pajola et al., 2015), finding that no changes occurred after comet perihelion passage. Consequently, we characterized the region by considering the erosion and insolation models covering the area (Keller et al., 2015), and using a high resolution DTM that allowed us to perform a more detailed geomorphological analysis regarding the height of niches' walls and the volume of the deposit material located at their feet. In addition, we performed a color analysis of the region identifying the presence of few bright patches, probably composed of ices. The next step will be the comparison of these results with pre-perihelion images to find if there are any compositional changes that occurred in that region. From this preliminary analysis we conclude that niches can be correlated to past landslide events that occurred on the comet. To strengthen our conclusion we will compare the fractures distribution on the niches' wall with those characterizing the boulders of the landslide deposit (with image of 6 – 10 cm/px in scale) in order to understand whether the fracture pattern is the same or fragmentation processes occurred after the landslide event.