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The global size-frequency distribution of boulders > 7 m on Comet 67P Churyumov-Gerasimenko

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After a ten years journey through the Solar System, the ESA Rosetta spacecraft reached on 6 August 2014 its primary target, the Jupiter family comet 67P/Churyumov-Gerasimenko, hereafter 67P.
During the approaching phase, several images of the nucleus of comet 67P, captured by the OSIRIS scientific imaging camera, have been taken to study its structure, activity and the surface morphology.
The close distance between spacecraft and comet, and the high resolution of our images, provided a unique opportunity to study features which could not have been detected before on other comets, but yet hold key parameters to derive the physical properties of the surface.
We made use of the images acquired by the OSIRIS Narrow Angle Camera, NAC, on 5 and 6 August 2014 in order to study the statistical size-frequency distribution and the morphological properties of both clustered and isolated roundish structures ("boulders") scattered all over the currently illuminated side of the comet (70% of the total surface). Such dataset has been taken at a distance ranging between 131.45 and 109.76 km far from the comet center and the scale of these images (2.44 - 2.03 m/px) is such that boulders $\geq$ 7 m can be unequivocally identified and extracted. These images are the last ones where the entire comet is 2048 x 2048 pixels full frame and they cover a complete comet rotation (12.4 h), hence providing the possibility to derive a global size-frequency distribution statistics of the presently illuminated surface of 67P.
A total amount of 3526 boulders has been identified on the surface of the comet: i) 2218 belonging to the big lobe, body, ii) 1115 boulders are located on the small lobe, head, while iii) 213 boulders belong to the transition region between the two lobes, called the neck.
Here, global cumulative size-frequency distributions of boulders per square km are presented, together with specific and localized areas distributions. Moreover we indicate the different formation processes that possibly lead to the formation of such boulders.