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Geomorphological mapping of the Comet 67P/Churyumov-Gerasimenko

L. Giacomini[1], M. Massironi[1], N. Thomas[2], M. Pajola[3], G. Cremonese[4], F. La Forgia[5], F. Ferri[3], M. Lazzarin[5], C. Barbieri[5], I. Bettini[5], S. Magrin[5], F. Marzari[5], G. Naletto[6], H. Sierks[7], and Rosetta OSIRIS team

[1] Dipartimento di Geoscienze, University of Padova, via G. Gradenigo 6, 35131 Padova, Italy
[2] Physikalisches Institut, Sidlerstr. 5, University of Bern, CH-3012 Bern, Switzerland
[3] Centro di Ateneo di Studi ed Attività Spaziali, "Giuseppe Colombo" (CISAS), University of Padova, Via Venezia 15, 35131 Padova, Italy
[4] INAF-Osservatorio Astronomico di Padova, vicolo dell'Osservatorio 5, 35122, Padova, Italy
[5] Dipartimento di Fisica e Astronomia, Università di Padova, Vicolo dell'Osservatorio 3, 35122 Padova, Italy
[6] Dipartimento di Ingegneria della Informazione, Via Gradenigo 6/B, 35131 Padova, Italy
[7] Max-Planck-Institut für Sonnensystemforschung, Justus-von-Liebig-Weg 3, 37077 Göttingen, Germany

Abstract.

OSIRIS, the Scientific Imaging System for Rosetta mission (Keller et al. 2007) has been acquiring images of the nucleus of the comet 67P/Churyumov-Gerasimenko since Aug 2014 with a resolution that allows a detailed analysis of its surface. Indeed, data reveal a complex surface morphology that is likely the expression of different processes affecting the cometary nucleus (Thomas et al. 2015). In order to characterize these different morphologies and better understand their distribution we performed a geomorphological mapping of the illuminated surface of 67P.

For this purpose we used NAC images acquired on August 5-8 with a spatial resolution ranging from 1.5 and 2.4 m/pixel.

Four different geological units have been identified (Fig.1) on the basis of their different surface textures: i) fine particle deposits, ii) consolidated material, iii) smooth terrain, and iv) mass wasting deposits. Some of these units appear distinctive of a particular region of the comet whereas other seem to be more common and scattered all over the nucleus. Moreover, five different types of lineaments have been distinguished (Fig.1), on the basis of their morphology, and they have been classified in: fractures, ii) strata heads, iii) cuesta and terrace margins, iv) niches, and v) dune-like feature crests. Some of them are never observed before on a comet and can give important clues on the internal structures of the nucleus. These geomorphological maps

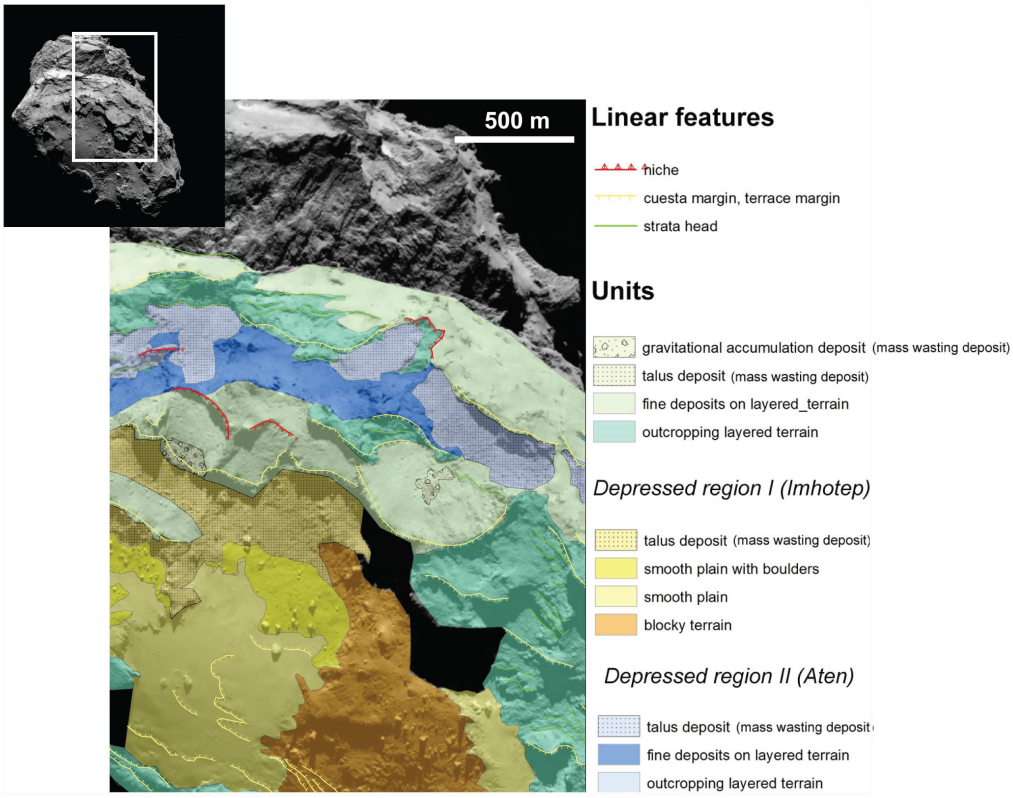

Fig. 1. Enlarged view of the geomorphological map of 67P's bigger lobe. Map highligts the presence of different units and lineaments.

will allow us to assess the stratigraphic relationship between the different units and therefore will possibly shed more light on the surface evolution of 67P/Churyumov-Gerasimenko.

References

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