

The Regolith Structure of Comet 67P on all Scales

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The ESA Rosetta spacecraft spent two years at comet 67P/Churyumov-Gerasimenko from August 2014 until September 2016. On board were 11 instruments and the lander Philae, which studied the approx. 4 km sized witness of the early solar system in detail and on many scales. The scientific camera system OSIRIS showed its remarkable shape and its morphology and textures down to centimetre details. This dataset is complemented by images from the cameras CIVA and ROLIS on the Philae lander, studying the lander's touchdown and final rest site called Agilkia and Abydos. On board the orbiting Rosetta spacecraft, a suite of three complementary in-situ dust instruments, together with the remote instruments, studied the dust coma and its individual particles down to a microscopic resolution of 14 μm (COSIMA optical microscope) and even 0.1 μm (MIDAS atomic force microscope). These dust particles were lifted from the comet's surface through gas activity and therefore represent the surface material on a different scale. In this presentation, we will combine our knowledge about the granular structure on the comet's surface with the size distribution and morphology of its dust particles. We will take into account global parameters like the porosity and the expected structure from the comet's formation scenarios.

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