

A Map of Rosetta's Comet

The surface of comet 67P/Churyumov-Gerasimenko can be divided into several morphologically different regions.

High-resolution images of comet 67P/Churyumov-Gerasimenko reveal a unique, multifaceted world. ESA's Rosetta spacecraft arrived at its destination about a month ago and is currently accompanying the comet as it progresses on its route toward the inner solar system. Scientists have now analyzed images of the comet's surface taken by OSIRIS, Rosetta's scientific imaging system, and allocated several distinct regions, each of which is defined by special morphological characteristics. This analysis provides the basis for a detailed scientific description of 67P's surface.

„Never before have we seen a cometary surface in such detail“, says OSIRIS Principal Investigator Holger Sierks from the Max Planck Institute for Solar System Science (MPS) in Germany. In some of the images, one pixel corresponds to 75 centimeters scale on the nucleus. „It is a historic moment, we have an unprecedented resolution to map a comet“, he adds.

With areas dominated by cliffs, depressions, craters, boulders or even parallel grooves, 67P displays a multitude of different terrains. While some of these areas appear to be quiet, others seem to be shaped by the comet's activity. As OSIRIS images of the comet's coma indicate, the dust that 67P casts into space is emitted there.

„This first map is, of course, only the beginning of our work“, says Sierks. „At this point, nobody truly understands, how the morphological variations we are currently witnessing came to be.“ As both 67P and Rosetta travel closer to the Sun in the next months, the OSIRIS team will monitor the surface looking for changes. While the scientists do not expect the borderlines of the comet's regions to vary dramatically, even subtle transformations of the surface may help to explain, how cometary activity created such a breathtaking world.

Next weekend, on 13 and 14 September 2014, the maps will offer valuable insights as Rosetta's Lander Team and the Rosetta orbiter scientists gather in Toulouse to determine a primary and backup landing site from the earlier preselection of five candidates.

Rosetta is an ESA mission with contributions from its member states and NASA. Rosetta's Philae lander is provided by a consortium led by DLR, MPS, CNES and ASI. Rosetta will be the first mission in history to rendezvous with a comet, escort it as it orbits the Sun, and deploy a lander to its surface.

The scientific imaging system OSIRIS was built by a consortium led by the Max Planck Institute for Solar System Research (Germany) in collaboration with CISAS, University of Padova (Italy), the Laboratoire d'Astrophysique de Marseille (France), the Instituto de Astrofísica de Andalucía, CSIC (Spain), the Scientific Support Office of the European Space Agency (The Netherlands), the Instituto Nacional de Técnica Aeroespacial (Spain), the Universidad Politécnica de Madrid (Spain), the Department of Physics and Astronomy of Uppsala University (Sweden), and the Institute of Computer and Network Engineering of the TU Braunschweig (Germany). OSIRIS was financially supported by the national funding agencies of Germany (DLR), France (CNES), Italy (ASI), Spain (MEC), and Sweden (SNSB) and the ESA Technical Directorate.

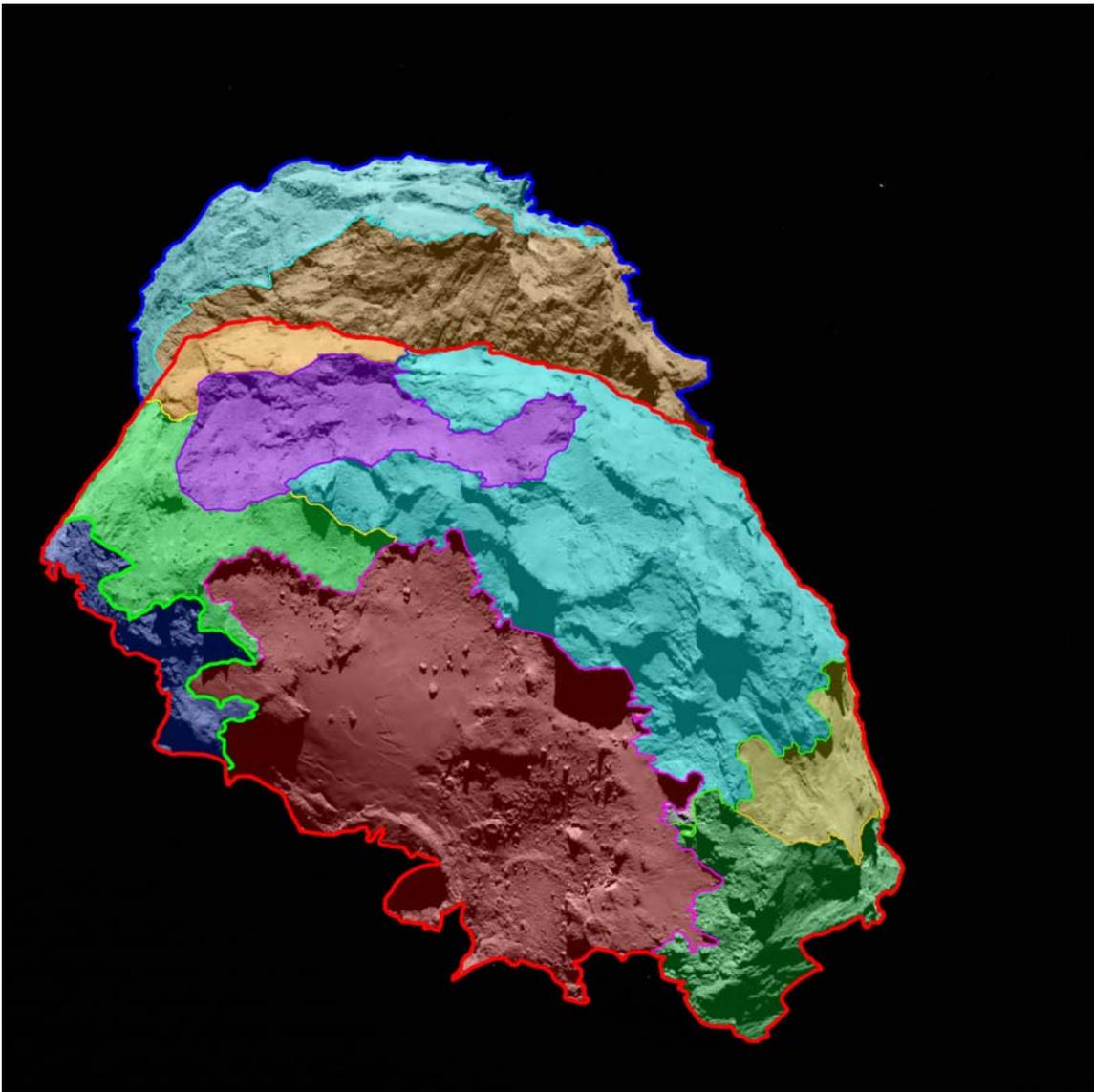


Figure 1: In this view of the “belly” and part of the “head” of comet 67P/Churyumov-Gerasimenko, several morphologically different regions are indicated.

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Figure 2: Jagged cliffs and prominent boulders: In this image, several of 67P's very different surface structures become visible. The left part of the images shows the side wing of the comet's "body", while the right is the back of its "head". The image was taken by OSIRIS, Rosetta's scientific imaging system, on September 5th, 2014 from a distance of 62 kilometers. One pixel corresponds to 1.1 meters.

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