Amazing new photo of Rosetta comet

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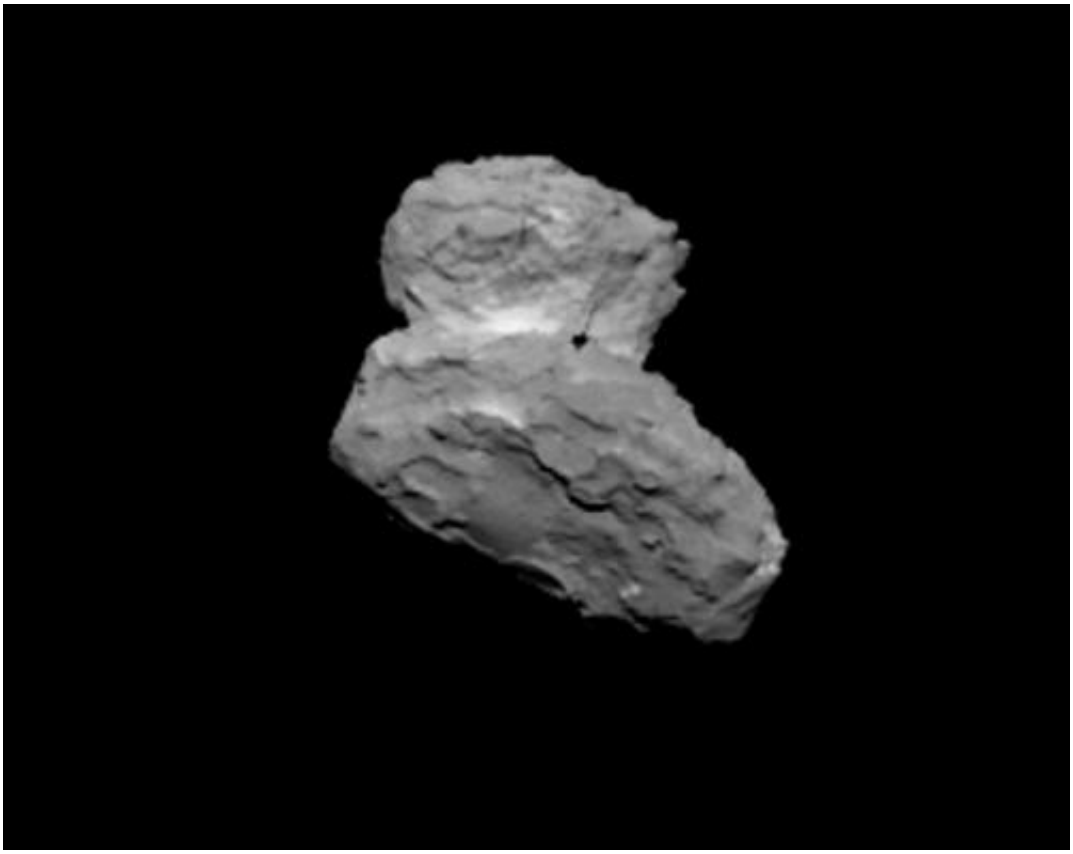

OSIRIS narrow angle camera view of 67P/C-G from a distance of 1000 km on 1 August 2014. Credits: ESA/Rosetta/MPS for OSIRIS Team MPS/UPD/LAM/IAA/SSO/INTA/UPM/DASP/IDA

As the ESA's Rosetta spacecraft closes to within 1000 km of Comet 67P/Churyumov-Gerasimenko, the Rosetta science team has released a new image and made the first temperature measurements of the comet's

core. The temperature data show that 67P is too hot to be covered in ice and must instead have a dark, dusty crust.

The new image was acquired on August 1st at 02:48 UTC by the OSIRIS Narrow Angle Camera onboard Rosetta at a distance of approximately 1000 km. It shows the rough surface of the double-lobed core in amazing detail.

Thermal observations of comet 67P/Churyumov-Gerasimenko were made by Rosetta's visible, infrared and thermal imaging spectrometer, VIRTIS, between 13 and 21 July, when Rosetta closed in from 14 000 km to the comet to just over 5000 km.

At these distances, the comet covered only a few pixels in the field of view and so it was not possible to determine the temperatures of individual features. But, using the sensor to collect infrared light emitted by the whole comet, scientists determined that its average surface temperature is about -70°C.

Although -70°C may seem rather cold, importantly, it is some 20–30°C warmer than predicted for a comet at that distance covered exclusively in ice.

"This result gives us the first clues on the composition and physical properties of the comet's surface," says VIRTIS principal investigator Fabrizio Capaccioni from INAF-IAPS, Rome, Italy.

Other comets such as 1P/Halley are known to have very dark surfaces owing to a covering of dust, and Rosetta's comet was already known to have a low reflectance from ground-based observations, excluding an entirely 'clean' icy surface. The temperature measurements provide direct confirmation that much of 67P's surface must be dusty, because darker material heats up and emits heat more readily than ice when it is

exposed to sunlight.

"This doesn't exclude the presence of patches of relatively clean ice, however, and very soon, VIRTIS will be able to start generating maps showing the temperature of individual features," adds Dr Capaccioni.

As Rosetta approachs and later orbits the comet, the sensor will study the variation of daily surface temperatures in order to understand how quickly the surface reacts to solar illumination. In turn, this will provide insight into the thermal conductivity, density and porosity of the top tens of centimetres of the surface—important data to help select a target site for Rosetta's lander, Philae.

It will also measure the changes in temperature as the comet flies closer to the Sun along its orbit, providing substantially more heating of the surface.

"Combined with observations from the other 10 science experiments on Rosetta and those on the lander, VIRTIS will provide a thorough description of the surface physical properties and the gases in the comet's coma, watching as conditions change on a daily basis and as the comet loops around the Sun over the course of the next year," says Matt Taylor, ESA's Rosetta project scientist.

"With only a few days until we arrive at just 100 km distance from the comet, we are excited to start analysing this fascinating little world in more and more detail."

Provided by NASA