Early results on 67P/Churyumov-Gerasimenko observed by Rosetta/OSIRIS

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67P/Churyumov-Gerasimenko (67P) is the target comet of the ESA Rosetta mission. Launched in 2004, the Rosetta spacecraft woke up on the 20th of January 2014. After 36 months of deep space hibernation, Rosetta is now traveling to rendezvous with the comet at 4.1 au from the Sun, and it will follow 67P along its orbit, investigating how the comet changes and evolves while approaching the Sun.

The Optical, Spectroscopic, and Infrared Remote Imaging System OSIRIS (Keller et al., 2007) is the scientific imaging system onboard Rosetta. It comprises the Narrow Angle Camera (NAC) with wavelength range 250–1000 nm and the Wide Angle Camera (WAC) with wavelength range 240–720 nm. The NAC (FOV $= 2.20 \times 2.22$ deg) is a system with high spatial resolution that allows an initial detection of the nucleus, studies its structure and rotation from relatively great distances, investigates the mineralogy of the surface, and studies the dust ejection processes. The WAC has much lower spatial resolution but, accordingly, a much wider field of view (about 11.35×12.11 deg). This allows observations of the 3-dimensional flow field of dust and gas near the nucleus and, in addition, provides a synoptic view of the whole nucleus. In summary, the WAC would provide long-term monitoring of the entire nucleus from close distances, while the NAC studies the details. The two camera units have been designed as a complementary pair, which, on one hand, addresses the study of the nucleus surface, and on the other hand, investigates the dynamics of the sublimation process.

After commissioning in March 2014, OSIRIS took first images of comet 67P and its dust environment. Ground-based observations performed in 2007/08 when 67P was in the same orbital arc as it will be in March/April 2014, show that the comet was already active at 4.3 au inbound and that its behavior was repetitive during the last three apparitions (Snodgrass et al. 2013). We therefore expect to detect early comet activity by OSIRIS in March/April 2014. At this time, Rosetta will be at about 4 million kilometers from the comet and 67P will still be unresolved.

We present results about the early cometary activity based on OSIRIS images. Orange-filter images (central wavelength 649.2 nm) will be used to determine the dust environment of 67P, since this wavelength range is quite free from gas emission lines.

Moreover, a series of lightcurves will be taken to compare with the existing ones and look for possible changes in the rotational period due to its last perihelion passage.

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