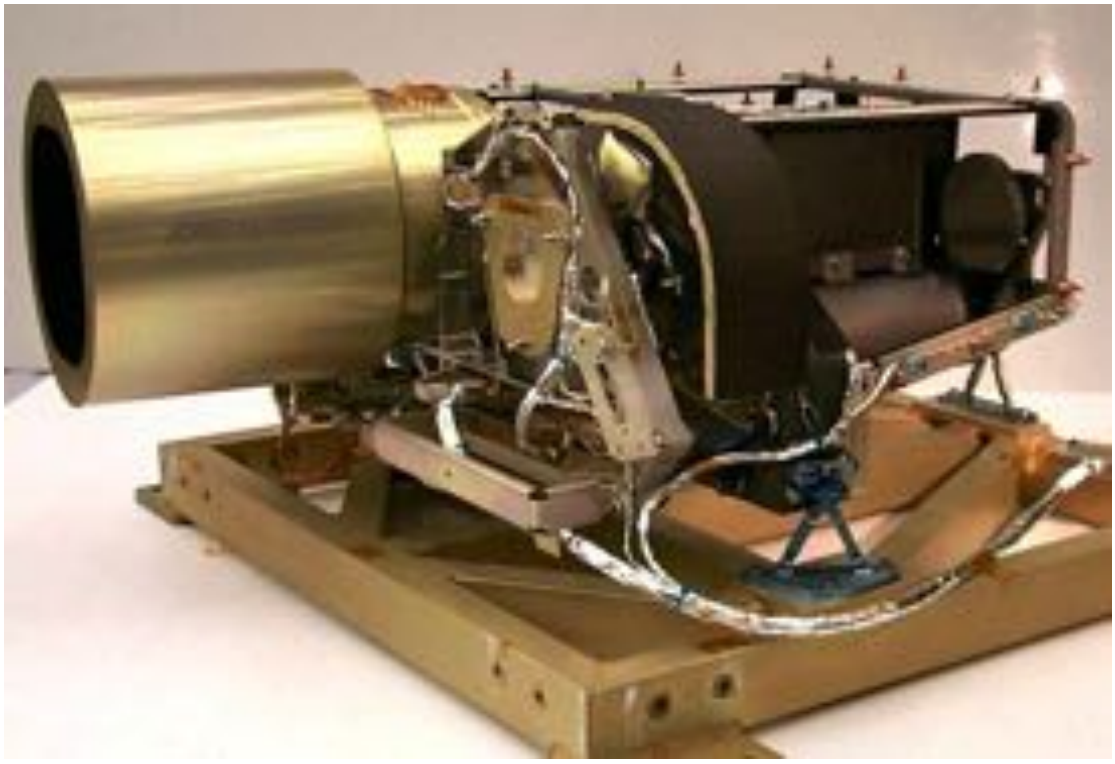
OSIRIS

OSIRIS is the main imaging system on the ESA mission Rosetta. The project started in 1994.

The system comprises two separate optical systems (a narrow angle camera, NAC, and a wide-angle camera, WAC), which are driven through a common electronics box. Several elements of the two cameras are duplicates of each other. For example, the filter wheels, the mechanical shutters, and the focal planes are identical.
The NAC has a pixel scale of around 18.6 urad/px with a point-spread function of around 1.2 pixels (FWHM). The resolution of the WAC is around five times lower. The NAC contains a series of moderately wide-band filters (typically 60 nm bandpass) designed to provide high-spatial resolution colours of the surface. The WAC contains a series of filters designed to isolate optical gas emissions with a set of continuum filters available to study the dust and its contamination of signal in the gas lines.



NAC Flight Model during integration

WAC Flight Model ready for integration.

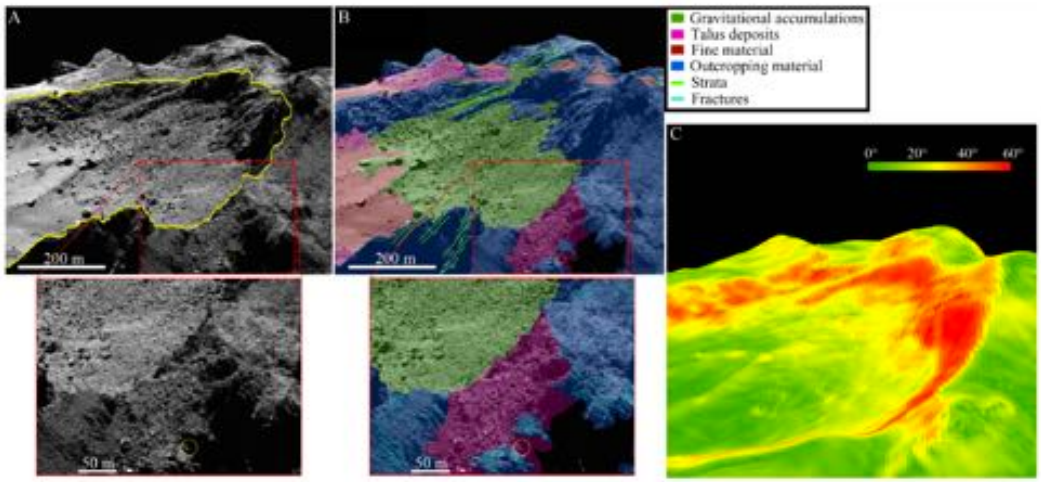
The University of Padova and the Astronomical Observatory of Padova (INAF) contributed with the design and realization of the Wide Angle Camera (WAC), the shutters and the front covers.

MAPS contribution

Our group is currently working on several aspects of the data analysis including:

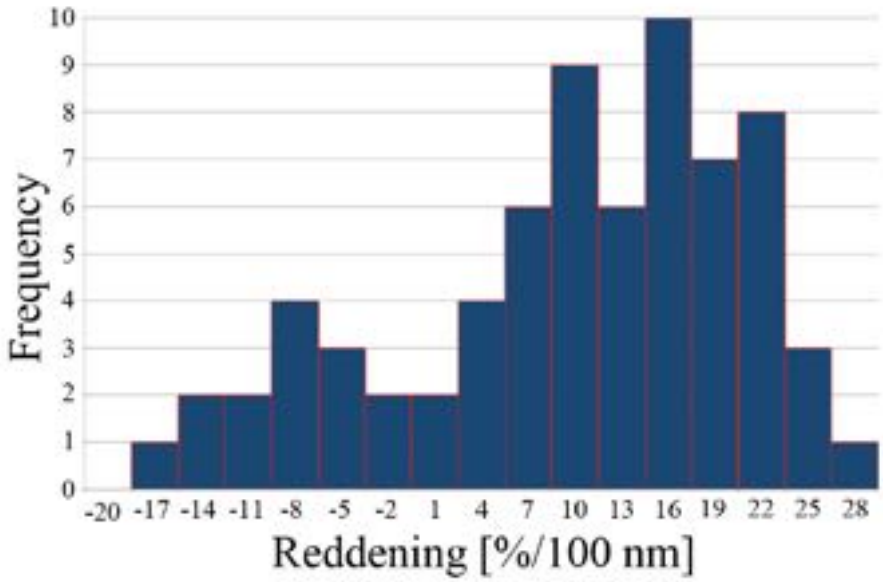
- Geomorphology of the comet nucleus
- Geological mapping of the nucleus
- Layering analysis on the nucleus
- Counting and analysis of the boulders on the nucleus surface
- Photometry of dust grains

We have characterized Abydos, the region where the lander Philae arrived on 12 November 2014, suggesting that is a primordial terrain (Lucchetti, et al., 2016, A&A, 585, L1).



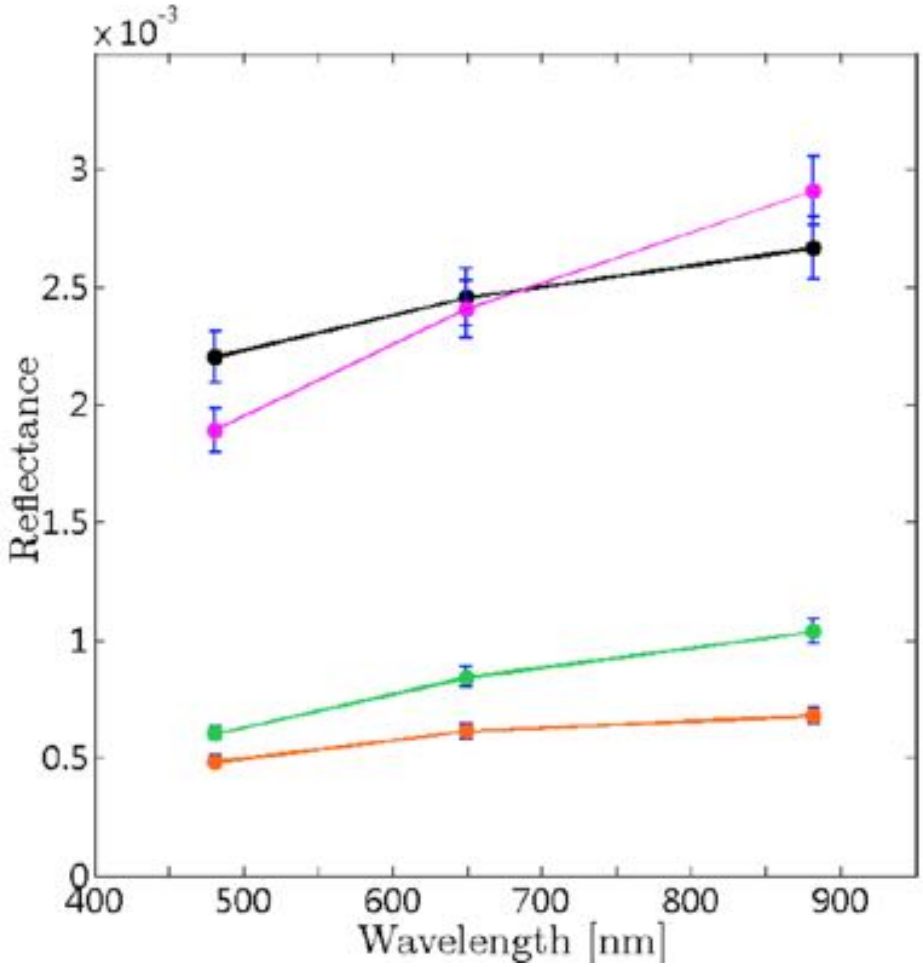
Images of the NAC/OSIRIS. Geological mapping of Abydos (Lucchetti et al., 2016)

We have started the photometric analysis of the single dust grains observed with OSIRIS nearby the comet nucleus.
The first results have been obtained on the first set of images of the coma obtained with two different filters (Cremonese, et al., 2016, A&A, 588, A59)



Histogram of the 70 grains measured on the September 2014 images (Cremonese et al., 2016).

Further analysis of dust grains have been performed on set of images obtained before and after the perihelion on 4 different filters. In this case 339 grains have been measured obtaining the reddening and how it depends from the heliocentric and nucleocentric distances, and making a spectrophotometric analysis. In the latter case we have suggested to have observed grains having organics or higher abundance of water ice looking at the spectra obtained with the 3-4 filters (Frattin, et al., 2017, MNRAS, 469, S195).



3-point spectra of four grains taken on 2015 November. The black one is supposed to be a grain composed by water ice. Indeed, the high reflectance and the flat spectrum are two conditions associated with the presence of water ice in the aggregate (Frattin et al., 2017).