

## ROSETTA scientific results one year after the rendez-vous

Y. LANGEVIN<sup>1</sup>

<sup>1</sup>Y. Langevin, IAS, CNRS / Univ.Paris-Sud, 91405 Orsay, France (correspondence : yves.langevin@ias.u-psud.fr)

The ROSETTA spacecraft made its final approach to the nucleus of comet 67P/Churyumov-Gerasimenko in early August, 2014, initiating the first rendez-vous mission to one of the most primitive bodies in the solar system. Since then, all 11 instruments on the orbiter payload have been obtaining high quality remote sensing and in-situ data on the nucleus and near comet environment at a distance ranging from  $\sim 10$  km to  $\sim 100$  km. The nucleus as observed by the OSIRIS has an irregular shape, with two connected main lobes. The VIRTIS VIS-NIR imaging spectrometer detected signatures of organic material on the surface. Surface water ice has been quite elusive, which came as a major surprise. MIRO (submm range) and VIRTIS obtained temperature maps and information on surface thermal conductivity. ROSINA obtained the first in-situ analyses of cometary gas with a mass resolution  $m/\Delta m > 3000$ . The GIADA dust monitor observed lower than expected dust velocities ( $< 15$  m/s). Both COSIMA ( $10 \mu\text{m} - 500 \mu\text{m}$ ) and MIDAS ( $1 \mu\text{m} - 10 \mu\text{m}$ ) could therefore collect cometary grains in a near-pristine state except for fragmentation during collection of low strength aggregates, with a likely link to IDP's.

The Philae lander was deployed on the 12<sup>th</sup> of November. After two rebounds, it finally came to rest in a cavity on the small lobe of the nucleus. The ROLIS descent imager and CIVA panoramic cameras fulfilled their primary objectives. During 3 days of operations on batteries, the magnetometer and plasma monitor (ROMAP) and the contact sensors (MUPUS, SESAME) obtained data on the lander environment. COSAC and PTOLEMY were able to provide information on the composition of near-surface cometary material (dust / gas). A first set of radio sounding measurements was performed by CONSERT. As of late March, contact attempts with Philae have not yet been successful, but the temperature and solar flux increase as the comet approach perihelion. If Philae wakes up, it will be possible to sample with the drill then to analyse the samples by COSAC, PTOLEMY and the VIS/IR CIVA microscopes, to perform APXS analyses and to resume radio sounding of the nucleus with Consert.

The major results of ROSETTA after one full year of operation will be presented, with a focus on those most directly related to geochemistry.