

Infrared detection of exposed Carbon Dioxide ice on 67P/CG nucleus surface by Rosetta-VIRTIS

Gianrico Filacchione (1), Andrea Raponi (1), Fabrizio Capaccioni (1), Maria Antonietta Barucci (2), Maria Cristina De Sanctis (1), Sonia Fornasier (2), Mauro Ciarniello (1), Alessandra Migliorini (1), Stephane Erard (2), Dominique Bockelee-Morvan (2), Cedric Leyrat (2), Federico Tosi (1), Giuseppe Piccioni (1), Ernesto Palomba (1), Maria Teresa Capria (1), Gabriele Arnold (3), Bernard Schmitt (4), Eric Quirico (4), Fred W. Taylor (5), and David Kappel (3)

(1) INAF-IAPS Istituto di Astrofisica e Planetologia Spaziali, IAPS, Rome, Italy (gianrico.filacchione@iaps.inaf.it), (2) LESIA, Observatoire de Paris/CNRS/UPMC/Université Paris-Diderot, Meudon, France, (3) Institute for Planetary Research, DLR, Berlin, Germany, (4) Université Grenoble Alpes, CNRS, IPAG, Grenoble, France, (5) Department of Physics, Oxford University, Oxford, UK

In the period August 2014 - early May 2015 the heliocentric distance of the nucleus of 67P/CG decreased from 3.62 to 1.71 AU and the subsolar point moved towards the southern hemisphere. We investigated the IR spectra obtained by the Rosetta/VIRTIS instrument close to the newly illuminated regions, where colder conditions were present and consequently higher chances to observe highly volatility ices than water.

We report about the discovery of CO₂ ice identified in a region of the nucleus that recently passed through terminator. The quantitative abundance has been determined by means of spectral modeling of H₂O-CO₂ icy grains mixed to dark terrains as done in Filacchione et al., *Nature*, 10.1038/nature16190. The CO₂ ice has been identified in an area in Anhur with abundance reaching up to 1.6% mixed with dark terrain. It is interesting to note that CO₂ ice has been observed only for a short transient period of time, possibly demonstrating the seasonal nature of the presence of CO₂ at the surface.

A parallel study on the water and carbon dioxide gaseous emissions in the coma above this volatile-rich area is reported by Migliorini et al., this conference.