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Minor species from comet 67P as measured from the VIRTIS-H instrument aboard Rosetta

D. Bockelée-Morvan(1), T. Encrenaz(1) , S. Erard(1), C. Leyrat(1), V. Debout (1), F. Capaccioni(2), G. Filacchione(2), P. Drossart(1), G. Arnold(3), N. Biver(1), J. Crovisier(1), B. Schmitt(4), N. Fougere(5), M. Combi(5) and the VIRTIS team .

(1) LESIA, Observatoire de Paris/CNRS/UPMC/Université Paris-Diderot, Meudon, France, (2) IAPS-INAF, Via del Fosso del Cavaliere 100, I-00133 Rome, Italy, (3) Institute for Planetary Research, Deutsches Zentrum für Luft- und Raumfahrt (DLR), Berlin, Germany, (4) Laboratoire de Planétologie de Grenoble (LPG) - University Joseph Fourier, Grenoble, France, (5) University of Michigan, Ann Harbor, MI 48109, USA.

Abstract

Since July 2014, the Visual IR Thermal Imaging Spectrometer (VIRTIS) onboard the ESA's Rosetta spacecraft has intensively observed comet 67P/ Churyumov-Gerasimenko (67P/C-G). First results were published in [3]. VIRTIS is composed of two channels, –M for mapping and –H for high resolution, working in the 0.25-5 μm and 2-5 μm wavelength domains, respectively [4]. In addition to nucleus mapping observations, limb observations were carried out to obtain spectra of the coma, and to detect fluorescence emissions of gas phase species. H_2O, CO_2, CO and organics have strong vibrational bands in the 2.5-5 μm range. The ν_3 vibrational bands of H_2O and CO_2 at 2.67 and 4.27 μm, respectively, were detected in mid-October 2014 using VIRTIS-H, and observed regularly since then [1,2].

In this contribution, we will present observations of minor species, such as OCS, CO, CH_4, NH_3, CH_3OH. These species have been detected in cometary atmospheres, some of them in comet 67P by other Rosetta instruments. Model simulations show that they should be detected with VIRTIS-H near perihelion. Observations with the VIRTIS instrument will allow us to investigate whether the outgassing distributions of the species and diurnal variations are related to their volatility. Data acquired in the November 2014 to January 2015 period indicate a very low CO abundance relative to water of less than 1.9% (3-sigma), and a CO/CO_2 upper limit of 0.7 (3-sigma), which show that 67P/C-G is CO-poor, as measured for other Jupiter-family comets.

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