



Publication Year	2017
Acceptance in OA	2020-09-21T15:47:06Z
Title	2 years with comet 67P/Churyumov-Gerasimenko: H ₂ O, CO ₂ , CO as seen by ROSINA RTOF
Authors	Hoang, M., Garnier, P., Lasue, J., Reme, H., Altwegg, K., Balsiger, H. R., Bieler, A. M., Calmonte, U., CAPRIA, MARIA TERESA, Combi, M. R., De Keyser, J. M., Fiethe, B., Fougere, N., Fuselier, S. A., Galli, A., Gasc, S., Gombosi, T. I., Hansen, K. C., Jäckel, A., Korth, A., Mall, U., MIGLIORINI, Alessandra, Rubin, M., Sémon, T., Tzou, C. Y., Waite, J. H., Jr., Wurz, P.
Handle	http://hdl.handle.net/20.500.12386/27459

2 years with comet 67P/Churyumov-Gerasimenko: H₂O, CO₂, CO as seen by ROSINA RTOF

Hoang, M. (*IRAP, Toulouse, France*); Garnier, P. (*IRAP, University of Toulouse, CNRS, UPS, CNES, Toulouse, France*); Lasue, J. (*Institut de Recherche en Astrophysique et Planétologie (IRAP), Toulouse, France*); Reme, H. (*Belgian Institute for Space Aeronomy, Brussels, Belgium*); Altwegg, K. (*University of Bern, Bern, Switzerland*); Balsiger, H. R. (*University of Bern, Physikalisches Institut, Bern, Switzerland*); Bieler, A. M. (*Belgian Institute for Space Aeronomy, Brussels, Belgium*); Calmonte, U. (*University of Bern, Physikalisches Institut, Bern, Switzerland*); Capria, M. T. (*IAPS-INAF, Rome, Italy*); Combi, M. R. (*Univ Michigan, Ann Arbor, MI, United States*); De Keyser, J. M. (*Belgian Inst Space Aeronomy, Brussels, Belgium*); Fiethe, B. (*Technical University of Braunschweig, Braunschweig, Germany*); Fougere, N. (*Univ Michigan, Ann Arbor, MI, United States*); Fuselier, S. A. (*Southwest Research Institute, San Antonio, TX, United States*); Galli, A. (*University of Bern, Bern, Switzerland*); Gasc, S. (*Physikalisches Institut, University of Bern, Bern, Switzerland*); Gombosi, T. I. (*Univ of Michigan, Ann Arbor, MI, United States*); Hansen, K. C. (*University of Michigan, Ann Arbor, MI, United States*); Jäkel, A. (*University of Bern, Bern, Switzerland*); Korth, A. (*Max Planck Institute for Solar System Research, Katlenburg-Lindau, Germany*); Mall, U. (*Max-Planck-Institut für Sonnensystemforschung, Göttingen, Germany*); Migliorini, A. (*IAPS-INAF, Rome, Italy*); Rubin, M. (*University of Bern, Physikalisches Institut, Bern, Switzerland*); Sémon, T. (*University of Bern, Bern, Switzerland*); Tzou, C. Y. (*Manassas, VA, United States*); Waite, J. H., Jr. (*Department of Space Science, Southwest Research Institute, San Antonio, United States*); Wurz, P. (*Physikalisches Institut, University of Bern, Bern, Switzerland*)

Abstract

The Rosetta space mission investigated comet 67P/Churyumov-Gerasimenko (67P) over two years from August 2014 to September 2016. Onboard the spacecraft, the ROSINA experiment included two mass spectrometers to derive the composition of neutrals and ions, and a COmet Pressure Sensor (COPS) to monitor the density and velocity of the neutrals in the coma. We will here analyse and discuss data from the Reflectron-type Time-Of-Flight instrument during the comet escort phase. The RTOF mass spectrometer possessed a wide mass range and a high temporal resolution (Balsiger et al., 2007). The analysis of 67P/C-G's coma major molecules over the mission showed strong variability of the comet coma's main volatiles concentrations (H₂O, CO₂, CO) and their relative abundances. The 2 years long Rosetta mission allowed us to observe the seasonal evolution in the atmosphere of 67P, in particular the change occurring during the equinoxes and at perihelion. In this work, we analyze the asymmetry in the outgassing rate before and after the perihelion (13/08/2015), the evolution of abundance ratios through the whole mission, and in particular the behavior of the very volatile CO molecules. Density maps projected on the surface of 67P demonstrate the evolution of the three main coma species after the outbound equinox. We will present first results of our comet nucleus thermal modelling used to simulate the internal structure and temperature evolution of 67P at characteristic surface areas. These results will be compared with the coma composition measurements obtained by ROSINA.