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Evolution of the coma composition at 67P/Churyumov-Gerasimenko as seen by ROSINA/Rosetta from November 2014 to April 2015

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The European Space Agency's Rosetta spacecraft, with the Rosetta Orbiter Spectrometer for Ion and Neutral Analysis (ROSINA) onboard [1], has been following and observing comet 67P/Churyumov-Gerasimenko (67P/C-G) since August 2014. ROSINA has provided new information on the molecular, elemental, and isotopic composition of 67P/C-G's coma [2,3].

ROSINA consists of a pressure sensor (COPS) and two mass spectrometers, the Double Focusing Mass Spectrometer (DFMS) and the Reflectron Time Of Flight mass spectrometer (RTOF). DFMS has a high mass resolution (ca. 3'000 at 1%) and a high sensitivity, whereas RTOF has a wide mass range (from 1 amu/e to >300 amu/e) and a high temporal resolution. Both mass spectrometers are designed to measure cometary neutral gas as well as cometary ions.

In this work, we present the first results and discuss the evolution of the composition of the coma measured by ROSINA from November 2014 until the end of March 2015. During this period, Rosetta delivered the lander, then stayed in bound orbits at distances of 20–30 km away from the comet center, and finally performed comet flybys from 10 km up to 250 km away from 67P/C-G.

[1] Balsiger, H. et al.: ROSINA-Rosetta Orbiter Spectrometer for Ion and Neutral Analysis, Space Science Reviews, Vol. 128, 745-801, 2007
[2] Altwegg, K. et al.: Comet 67P/Churyumov-Gerasimenko, a true Kuiper belt comet as judged from its D/H in water, Science Express, 2014
[3] Hässig, M. et al.: Time variability and heterogeneity in the coma of 67P/Churyumov-Gerasimenko, Science, in press, 2015