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An overview of the measurements made by the COSAC instrument at comet 67/P Churyumov-Gerasimenko

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In this paper data recorded by the Cometary Sampling and Composition experiment (COSAC), a pyrolysis - gas-chromatograph - mass-spectrometer (pyr GC-MS) aboard Philae are presented. After landing in a somewhat non-nominal way on the cometary nucleus of 67/P, Philae carried out its First Science Sequence. As part of these activities COSAC acquired seven mass-spectra in sniffing mode, the first while still flying, the other at the final landing site. In addition, since drilling of a soil sample was attempted at the final site, a combined GC-MS measurement was performed on the sample transferred to COSAC. In the MS measurement made after the first touch-down a wide range of mass peaks was observed. These are ascribed to a variety of organic compounds, quite a few of them oxygen and nitrogen bearing species. However, no sulfur compounds were detected. The following six MS sniffings showed peaks of decreasing signal intensity mostly, but not completely, following the temperature drop pertaining aboard Philae. The results of the GC-MS measurement were, if at all, only marginally different from an empty run performed by COSAC in April 2014 when Rosetta was still far from the comet. The implications of this result namely: (1) was a sample delivered at all? (2) what do the small signals mean?) will each be discussed.



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