

The COSAC experiment of the Rosetta mission: performances under representative conditions and expected scientific return

C. Szopa (1), F. Goesmann (2), H. Rosenbauer (2), R. Sternberg (3) and the COSAC team

(1) Service d'Aéronomie, UMR CNRS 7620, IPSL, Verrières-le-Buisson (Fr), (2) Max-Planck-Institute for Solar System Research, Katlenburg-Lindau (Ger), (3) Laboratoire Interuniversitaire des Systèmes Atmosphériques, UMR CNRS 7583, Créteil (Fr.). (contact: cyril.szopa@aerov.jussieu.fr)

The COSAC (Cometary Sampling and Composition) experiment of the Rosetta mission is now on its way to comet 67/P Churyumov-Gerasimenko. This experiment is a combined gas chromatograph (GC)-mass spectrometer (MS) situated in Philae, the lander of the mission, which is intended to land on the cometary nucleus. The purpose of the experiment is to analyse the volatile fraction of cometary nucleus samples retrieved by a drill. For investigation, the samples will be soft heated and pyrolysed. The gases evolving from the heated samples will then be analysed by a GC, a MS, or the combination of both analysers. During the development of the experiment, various calibrations were done at the instrumental component level (e.g. GC columns or MS), but calibration of the whole experiment in its final configuration was limited. This paper presents the results of a first extensive campaign of calibration of the experiment, achieved after the probe launch with the COSAC spare model, identical to the flight one. The goal of this campaign was mainly to characterize the gas chromatographic performances under operating conditions representative of that of the cometary surface, and to evaluate the performances of the GC-MS coupling mode. These results are compared with calibrations achieved at the component level on laboratory test benches. From these results, we can evaluate the scientific return we can expect from the cometary material analysis with COSAC, with a more particular interest for astrobiological information.