



Long-term in-situ Monitoring of cometary Outgassing; one Task for the COSAC Instrument onboard Philae

F. Goesmann, R. Roll

Max-Planck-Institute for Solar System Research, Max-Planck-Strasse 2, 37191
Katlenburg-Lindau, Germany

COSAC, the COmetary SAMpling and Composition experiment, is one of two evolved gas analysers onboard the Rosetta lander. The instrument comprises a gas-chromatograph and a mass-spectrometer to be used individually or coupled. Material for investigation can be taken from pyrolysis ovens filled with soil samples. Alternatively the gas environment may be measured directly via the so-called sniffing mode described here.

Since comets are thought to have delivered important molecular supplies for the development of life on earth such measurements may add to the understanding of how life emerges on planets. The main advantage of COSAC over other observational methods is its proximity. It will be located on the surface of the nucleus of comet 67P/Churyumov–Gerasimenko. Therefore the evaporating species will be little processed by sunlight and their density is higher than anywhere else.

The landing is planned when the comet is three AU from the sun. Judging by the development of H₂O production as a function of solar distance for several comets an increase by at least a factor of ten can be expected between three AU and perihelion at 1.29 AU. Similar numbers are expected for all other molecular species, too. A crude estimation of the expected particle densities from the nucleus size, probable escape velocities, and measured gas production rates suggests near optimum measurement conditions for the MS of COSAC.

Example spectra obtained during the commissioning of the space craft will be presented.