

67P and comets in an astrobiological context

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Comets are commonly regarded as objects with a prime astrobiological importance. They are reservoirs of a large amount of material considered as necessary for the origin of life: water and organic molecules. While the measurement of the D/H ratio in the water of comet 67P established in the early stages of the mission that comets such as 67P are probably not a significant source of water on Earth, the nature and amount of the volatile organic content of comet 67P is progressively revealed through the complementary measurements of instrument such as ROSINA, COSAC, PTOLEMY. The detection of glycine and phosphorous atoms in the atmosphere of the comet have demonstrated the presence of so called “prebiotic” ingredients. However, it takes certainly much more than this to feed the chemical evolution toward the origin of life on a planet.

On the other hand, the COSIMA instrument, analysing the composition of dust particles ejected from the nucleus, has shown that the refractory organic component of those aggregates is found as a macromolecular phase, which bears some similarities with Insoluble Organic Matter detected in carbonaceous chondrites. This organic phase would constitute about half of the mass of the dust particles, hence one of the main form of carbon in the comet.

The form in which carbon has been delivered to the early Earth, and implications for the origin of life, will be discussed with regard to this new inventory of organic matter detected by Rosetta instruments in comet 67P