The composition of cometary dust, inputs from Rosetta and collections on Earth

Cecile Engrand and COSIMA team

Cosmic dust is collected on Earth in places with a low accumulation rate of terrestrial dust, like the polar caps or the stratosphere. IDPs collected in the stratosphere by NASA contain a fraction of particles of presumed cometary origin. Cosmic dust from the polar caps are larger than IDPs and are referred to as micrometeorites (MMs). The Concordia MM collection contains particles that are dominated by organic matter and that are very probably cometary. The Stardust and Rosetta missions also gave access to the structure and composition of cometary dust. Stardust brought back dust particles from comet 81P/Wild 2, but the collection occurred at high relative velocity (6 km/s) and the samples were altered during the collection. The Rosetta mission collected dust particles from comet 67P/Churyumov-Gerasimenko at much lower velocity (1-10 m/s), and the analyses were performed in situ onboard the Rosetta orbiter by the dust instruments (GIADA, COSIMA, MIDAS). The CAESAR mission is also currently under study to bring back a sample from comet 67P/Churyumov-Gerasimenko.
We will summarize the present knowledge on the composition of cometary dust, based on the results of Rosetta, Stardust and of laboratory analysis of dust particles collected on Earth.