Dust in comet 67P/Churyumov-Gerasimenko

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Single particle detections by the in-situ dust sensor GIADA and optical sensors WAC and NAC of OSIRIS cameras on board Rosetta Mission, are here considered to extract the loss rate, size and velocity distributions of dust ejected by Jupiter Family comet 67P/Churyumov--Gerasimenko from 3.5 AU to 2 AU before perihelion. GIADA data allow us to constrain the dust bulk density values, ranging from that of very fluffy particles, of equivalent density below 1 kg m^{-3} (consistent with pristine interstellar dust), to typical silicate values of 3 10^3 kg m^{-3} (consistent with dust processed in the early phases of Solar System formation). The good agreement between the size distributions obtained from 67P ground-based observations before 2010, from the Rosetta orbiter at distances of about 100 km from the nucleus, and of the individual stones of size larger than some mm observed on the nucleus surface by the ROLIS camera during the lander descent, imply that sublimation and fragmentation processes have so far negligible observable effects on 67P dust.