Geophysical Research Abstracts
Vol. 18, EGU2016-15640, 2016
EGU General Assembly 2016

Monitoring 67P/C-G coma dust environment from 3.6 AU in-bound to the Sun to 2 AU out-bound

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GIADA, on board the Rosetta/ESA space mission is an instrument devoted to monitor the dynamical and physical properties of the dust particles emitted by comet 67P/Churyumov-Gerasimenko (hereafter 67P/C-G) along its orbit, from 3.6 AU in-bound to the Sun to 2 AU out-bound. Since the 17th of July 2014 GIADA is fully operative and was able to measure the speed and mass of individual dust particles.
GIADA capability of detecting dust particles with an high time resolution and the accurate characterization of the physical properties of each detected particle allowed the identification of two different families of dust particles emitted by 67P/C-G nucleus: compact particles with densities varying from about 100 kg/m^3 to 3000 kg/m^3 and the fluffy particles with densities down to 1kg/m^3.
GIADA continuous monitoring of the coma dust environment of comet 67P/C-G along its orbit, accounted for the different geometry of the observation along Rosetta trajectories, enabled us to: 1) investigate how the dust fluxes for each particle family evolves with respect to the heliocentric distance; 2) identify the nucleus/coma regions with high dust emission/density; 3) observe the changes that this regions undergo along the comet orbit; 4) measure and monitor the dust production rate; and, 5) evaluate the 67P/C-G dust to gas ratio by coupling GIADA measurements with the results of the Rosetta instruments devoted to gas measurements (MIRO and ROSINA).