

Colour cycling on 67P/CG coma and nucleus during Rosetta mission

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Understanding how comets work and evolve is one of the most compelling questions to which the Rosetta mission is trying to answer. In this perspective, we investigate the temporal evolution of 67P/Churyumov-Gerasimenko coma dust particles and nucleus surface spectral properties with the aim to describe the processes occurring at different heliocentric distances, to search for possible correlations between coma and nucleus evolution and to verify their dependence on activity. VIRTIS data show two opposite seasonal colour cycles developing on the coma dust particles and on the surface both driven by the relative water ice fraction. Spectral indicators are used to infer dust grain sizes and composition by means of their scattering properties. Our study shows that an enrichment of submicron grains made of organic material and amorphous carbon is necessary to simulate the observed spectral changes occurring in the coma during the perihelion passage while water ice grains are compatible with observations taken far from the Sun.