Geophysical Research Abstracts
Vol. 21, EGU2019-18885-1, 2019
EGU General Assembly 2019

End-of-Mission ROSINA/COPS observation of the innermost coma of comet 67P/Churyumov-Gerasimenko

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End-of-mission pressure measurements performed with ROSINA/COPS presented a unique chance to probe the coma of 67P/Churyumov-Gerasimenko in the altitude range starting from tens of kilometers down to the surface of the nucleus of the comet. That is an unprecedented opportunity to uncover effects that topology and activity of the nucleus have on the structure of the coma very close to the nucleus. The primary focus of the presented study is analyzing these measurements using the numerical modeling of the comet environment.

At the end of the Rosetta mission, 67P/Churyumov-Gerasimenko was at a heliocentric distance of 3.8 AU where the coma is collisionless. That makes it possible to apply the Liouville theorem to characterize the distribution of volatiles in the coma, as we have done in our analysis. We have used the SHAP7 nucleus model to account for the topology of the volatile source. Spacecraft trajectory and the instrument pointing relative to the comet's nucleus have been determined with the SPICE library. Here, we present the results of our analysis and discuss the effects of the surface topology and that of the local surface volatile injection on the distribution of gas in the innermost coma of comet 67P/Churyumov-Gerasimenko.