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Cometary Coma Composition: chemical reactions versus dust-generated gas

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The gas composition in the cometary coma depends on the gas flow from the nucleus, the chemical reactions in the out-flowing gas, and gas release from the dust. The vaporization of ices from the dust component may also play a role for fragmentation events. Observations during the Stardust mission, for instance, showed variations of dust flux and size distribution that are possibly caused by dust fragmentation that is induced by vapor released from the dust. We utilize a previously established chemical reaction network of the coma and include the outgassing from icy dust to study the differences between the secondary sources due to chemical reactions and the secondary sources due to dust and ices. The ROSINA mass spectrometer on board of the ESA/Rosetta spacecraft will measure the coma composition of comet Churyumov-Gerasimenko. We will study the possible distinction of these two secondary sources in the coma measurements.