A Versatile Physicochemical Model for Small Solar System Bodies (SUISEI)

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A suite of computational tools, named SUISEI, has been developed over the past decades and successfully applied to interpret observations of comets. A brief overview of SUISEI will be given; including ComChem, a global, multifluid gas dynamics simulation with detailed chemical kinetics of the cometary coma; coupled with ComDust, a model of comet dust evolution and interaction with gas; and ComNuc, a 3-D simulation of gas and heat flow within the comet nucleus porous subsurface layers. The combination of these tools have resulted in an improved knowledge of chemical species that form in cometary environments and their relationship to native molecules that exist in the nucleus ices by analyzing space- and ground-based observations and *in situ* measurements by instrumentation onboard spacecraft missions. This model is especially timely with the recent encounter of ESA's Rosetta spacecraft with Comet 67P/Churyumov-Gerasimenko which ended in September 2016. Applications of SUISEI will be made to comets and the near-Sun object, (3200) Phaethon.

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