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Four Fluid Plasma-Neutral Simulations of the Plasma Environment of 67P/C-G

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A 3D four fluid (solar wind ions, cometary ions, electrons and cometary neutrals) simulation capability has been developed for the support of the Rosetta mission. Our model is based on our multi-physics code, BATS-R-US, within the SWMF (Space Weather Modeling Framework) that solves the governing equations of multi fluid HD/MHD. The model includes various mass-loading processes, including ionization, charge exchange, dissociative ion-electron recombination, as well as collisional interactions between different fluids. Simulation results are presented for various heliocentric distances and compared to Rosetta neutral and ion observations.