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The Variability of the Enceladus Plume as Determined by Modeling and Recent Cassini Observations

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The intensity of the Enceladus plume has been studied using our self-consistent MHD and hybrid simulations constrained by plasma and field data. By achieving the best fit to each of the seven flybys in 2005 and 2008, we have found up to 30% variation of the plume intensity between different flybys. In 2009 Cassini penetrated the Enceladus plume twice from a distance of 1.4 and 7.3 Enceladus radii, respectively. In contrast with previous flybys, in 2009 Cassini travels parallel to the equatorial plane, and primarily in the radial direction of Saturn. In this study we add these new observations to our past studies, and attempt to include new physics that has been suggested by recent model-data comparisons. In addition, we compare the results between hybrid and MHD simulations and include more constraints from the plasma data.