

## **Impact Vaporization at Mercury: Limits from the MASCS Data**

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Vaporization of volatiles in the regolith by the impact of micrometeoroids is widely considered to be an important source of neutrals in Mercury's exosphere. However, the impact vaporization rate is not well known due to uncertainties in the density and velocity distributions of the interplanetary dust and the vapor production rate of impacting dust particles. Attempts to determine this rate by modeling the dust transport to Mercury's orbit have produced a wide range of estimates of the micrometeoroid flux to the surface (e.g. Cintala, JGR, 97, 947-973, 1992; Borin *et al.*, A&A, 503, 259-264, 2009).

We constrain the production rate of neutrals by impact vaporization by comparing the predicted brightness of an impact vaporization-produced exosphere with observations of Na, Ca, and Mg by the Mercury Atmospheric and Surface Composition Spectrometer (MASCS) during the three MESSENGER flybys of Mercury. Our results suggest that, even in the absence of other exospheric sources, the impact vaporization rate is consistent with the lower end of estimates of the vapor production rates.