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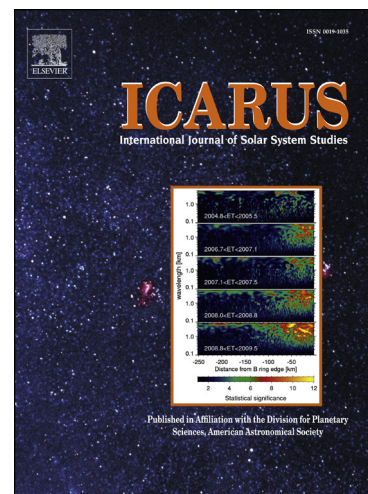
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**Chlorine on the Surface of Mercury: MESSENGER Gamma-Ray Measurements and
Implications for the Planet's Formation and Evolution**

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Abstract

Orbital measurements obtained by the MESSENGER Gamma-Ray Spectrometer have been analyzed to determine the surface abundance of chlorine in Mercury's northern hemisphere. The derived Cl/Si mass ratio is 0.0057 ± 0.001 , which for an assumed Si abundance of 24.6 wt% corresponds to 0.14 ± 0.03 wt% Cl. The abundance of Cl is a factor of 2.9 ± 1.3 higher in the north polar region ($>80^\circ$ N) than at latitudes 0° – 60° N, a latitudinal variation similar to that

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