



Compositional analysis of Jovian stream particles and its implications for the Io volcanism

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The Cassini spacecraft encountered Jupiter in late 2000. Within 1 AU distance from the gas giant the Cosmic Dust Analyser onboard the spacecraft recorded for the first time mass spectra of Jovian stream particles.

To determine the chemical composition of particles, a comprehensive statistical analysis of the dataset was performed. Our results imply that the vast majority (> 95%) of the detected dust particles are originated from the volcanic active Jovian satellite Io from where they are sprinkled out far into the solar system.

Sodium chloride (NaCl) was identified as the major particle constituent, accompanied by sulfurous as well as potassium bearing components. This is in contrast to observations of gas in the Ionian atmosphere, its corotating plasma torus, and the neutral cloud, where sulfur species are dominant while alkali and chlorine species are only minor components.

Io has the largest volcanoes of the solar system with plumes reaching heights of more than 400km above the moons surface. Our findings indicate that alkaline salt condensation of volcanic gases inside those plumes might be the dominant formation process for particles reaching the Ionian exosphere.