

Cometary delivery to Earth: constraints from noble gas measurements of 67P

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Determining the origin and timing of volatile delivery to planetary bodies is essential for understanding the origin and evolution of Earth's atmosphere and oceans. Comets represent some of the most pristine, volatile-rich bodies in the Solar System. However, their potential to have distributed volatiles throughout the planets of the inner Solar System remains poorly understood.

Measurements of noble gases within Comet 67/P Churyumov-Gerasimenko by the ROSINA mass spectrometer on board the ESA Rosetta spacecraft have allowed constraints to be placed on the contribution of comets to the Earth's atmosphere. Noble gases are key tracers for the origin(s) and processing of volatile elements in the solar system and in planetary atmospheres. The analysis of Comet 67P/C-G has shown that comets are rich in noble gases indicating that a significant fraction of these elements in the terrestrial atmosphere could be of cometary origin.

Here we will present new calculations for the amount of cometary volatiles delivered to the Earth, based on recently measured noble gas isotopes from Comet 67/P. We will discuss the broad implications of cometary delivery in relation to planetary formation and atmosphere evolution.