

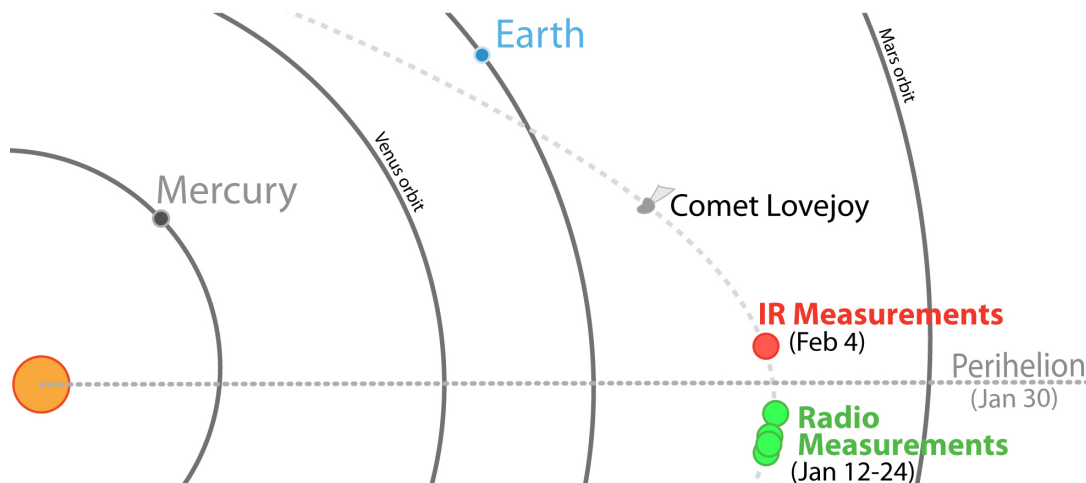
Comet Lovejoy Sheds Light on the Source of Earth's Water

What is the science question? What is the D/H ratio of comets? Deuterium (D) is an isotope of hydrogen (H). The ratio of these hydrogen isotopes in cometary water can be used to determine the amount of water these icy bodies delivered to Earth's oceans.

What were your findings? We measured the amount of deuterium (D) and hydrogen (H) in Comet Lovejoy after perihelion passage (Feb 4), and compared them to measurements made by another group before perihelion. When comparing these results, we observed an increase of deuterated water (HDO) relative to water (H₂O) after perihelion passage.

What was the impact? Unaccounted for effects such as radiation near the Sun could modify water's deuteration, and thus the reported D/H ratio in comets.

Why does it matter to non-scientists? The implications for cometary contributions to Earth's water could be biased if they are based on single measurements of D/H per comet.



L. Paganini, M.J. Mumma, E.L. Gibb, G.L. Villanueva, (2017), "Ground-based detection of deuterated water in comet C/2014 Q2 (Lovejoy) at IR wavelengths", *Astrophysical Journal Letters*, **836**, L25, 10.3847/2041-8213/aa5cb3.