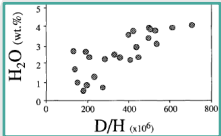




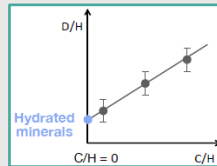
## D/H Estimation with LG-SIMS in Meteorites from Space Missions

### Two methods to measure D/H isotopic ratio



Historical one with  $O^-$  ion beam (Deloule and Robert, 1995)

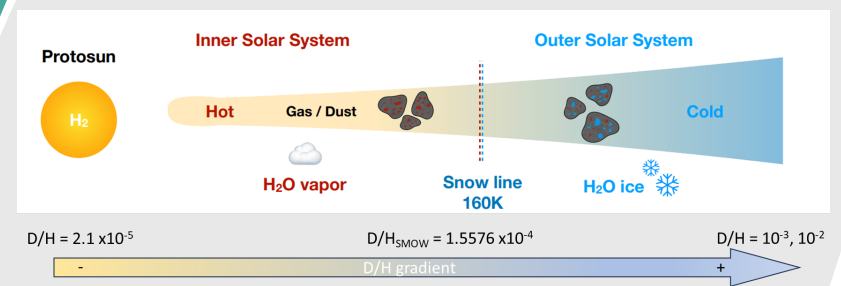
More recent one using  $Cs^+$  ion beam (Piani et al., 2018) provides higher H sensitivity and reduces molecular interference between Deuterium and  $H_2$



Both ways show good agreement and reveal a distinct D/H signature for water content in each family of Chondritic parent body



## Theoretical Water Distribution in Early Solar System



Before Snow line → "Dry" Enstatite and Ordinary Chondrites

Beyond Snow line → Water-bearing Carbonaceous Chondrites



## Ongoing Quest: Origin of Earth's Water

### Previous research findings

- Earth rocks are dominated by "Dry" non-carbonaceous materials like Enstatite Chondrites (Javoy et al., 2010; Dauphas, 2017)
- Water and volatiles were delivered by hydrated bodies from the outer solar system such as Carbonaceous Chondrites

### Discovery of Enstatite Chondrites (ECs) contribution

- Piani et al. (2020) showed that ECs contain more water than expected and enough to explain a portion of Earth's water
- H and N isotopic ratios in ECs match the Earth's Mantle signature



QUICK TIPS

### For high performance Dynamic SIMS Characterization

- SIMS analyses are **in situ** and less prone to terrestrial contamination than other techniques
- To minimize Hydrogen background: **Sample preparation** is crucial (pressed in Indium, polished with Al powder and Ethanol, baking and coating, placed under vacuum in SIMS for days) + **Electron gun fine tuning** (charge compensation)

Watch the webinar:

[CLICK HERE](#)

Or scan the QR code

