

Are Comets the source of our water?

Literature research into D/H ratio

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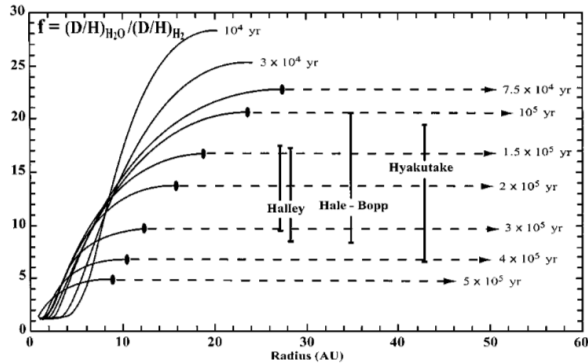
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D/H ratio of asteroids and comets

Depends on:

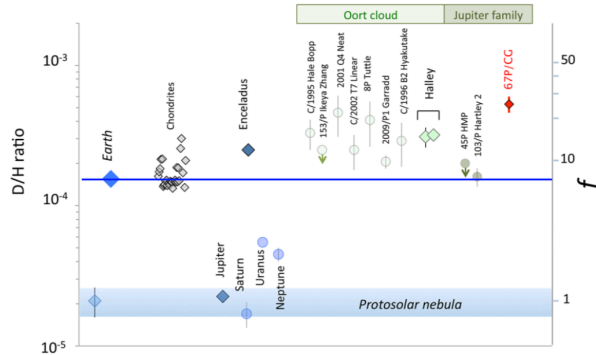
- position of creation
 - Asteroid Belt
 - Kuiper Belt
 - Oort Cloud
- for comets: behind the snow line
- time of creation

Timescale creation of comets



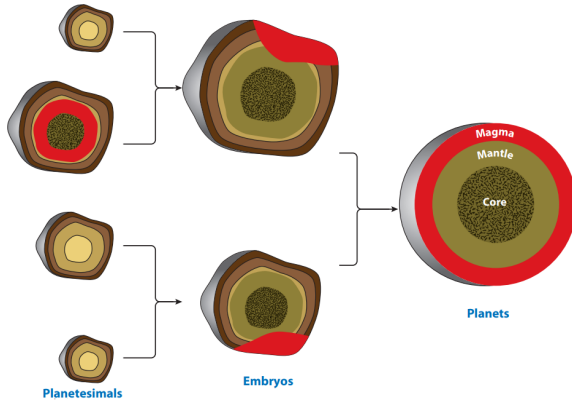
(source: O. Mousis *et al.*, 2000)

D/H ratio in the Solar System - measurement data



(source: K. Altwegg *et al.*, 2014)

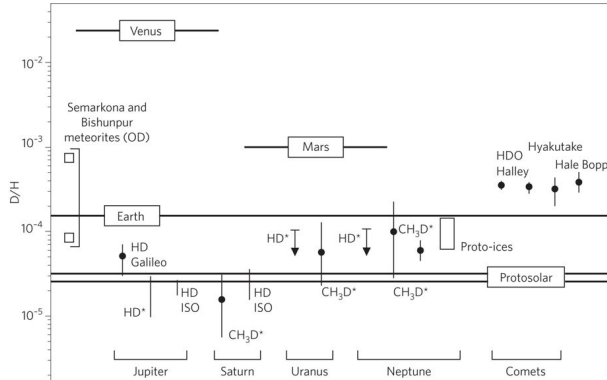
Collisions protoplanets



(source: L. T. Elkins-Tanton, 2012)

- ① Volatile elements absorption onto grains due to:
 - ① Physisorption
 - ② Chemisorption
- ② Volatile elements are stored inside the planetesimals.
- ③ Volatile elements are released in the atmosphere due to magma ponds.

Current D/H ratio of terrestrial planets



(source: A. Ingersoll, 2017)

Extra-Planetary Objects

Comets

- High Water Content
- Sufficient Quantities
- High D/H Ratio

Asteroids

- Closer D/H Ratio
- Possibly Insufficient Quantities
- Questions Raised About Primordial Belt

Effects of Bombardment

- Atmosphere Generation
- Plate Tectonics
- Lava Oceans
- Impact Winter

Evidence for and against Bombardment

Supporting Evidence

- Highly Siderophile Elements Distribution
- Moon was Heavily Bombarded.

Contrary Evidence

- Size of Planet Earth at Time-frame Mentioned
- There is Evidence of Water Before LHB

Ambiguous Evidence

- Zircon
 - Presence of water at Cool Earth Temperatures
 - Melted and Depleted as Expected with LHB

Are Comets the Source of Water on Earth

This question remains largely unanswered.

Questions

Thanks for listening Questions?

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