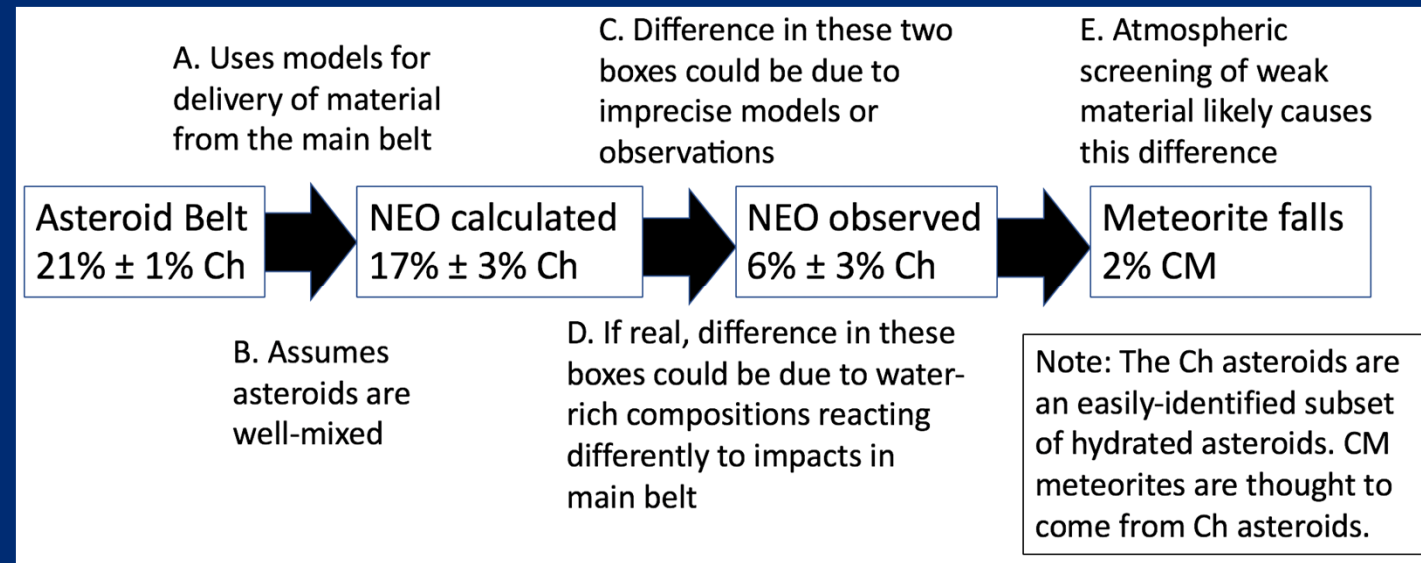


How many near-Earth asteroids have water in their minerals?

101955 Bennu, one of the most accessible hydrated asteroids and the OSIRIS-REx target



- Asteroids in Earth-like orbits (NEOs) require less fuel for a spacecraft to visit than the lunar surface because of their low gravity.
- Some of these objects are up to ~10% water by mass, making them attractive sources for obtaining water for science, life support, or propellant.



Flow chart describing the steps followed by hydrated asteroids (Ch-type) from the main belt to the Earth (where they are associated with CM-type meteorites).

We estimate that roughly 6% of NEOs should be hydrated. Adopting that fraction and making reasonable assumptions implies dozens of known NEOs 1 km and larger are hydrated, and hundreds are > 100 m in diameter and more accessible on a round trip than the surface of the Moon.



The Sutter's Mill meteorite. A CM-type meteorite that struck California in 2012 is rich in hydrated minerals.

We have estimated the number of hydrated near-Earth asteroids. Fewer candidates are seen than would be expected from theory, but there are still hundreds of known objects that should be 100 meters in diameter or larger and more accessible than the Moon.