

Evidence of water movement found in meteorites that only recently fell to Earth

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A team of researchers affiliated with institutions in Australia, the U.S. and France has found evidence of relatively recent water movement in meteorites that only recently collided with the Earth. In their paper

published in the journal *Science*, the group describes their study of carbonaceous chondrite (CC) meteorites that landed on the surface of the Earth within the past century and what they found.

A lot of scientists believe that the water present on Earth came from meteorites. This theory has been difficult to prove because the meteorites recovered to date do not contain water and because [chemical reactions](#) that might have involved comet-borne water occurred millions of years ago. In this new effort, the researchers took a look at the idea from another angle—they studied [isotopes](#) in meteorites that have landed on Earth over just the past century.

Prior research has suggested that most, if not all, CC meteorites were formed approximately 4.5 billion years ago as part of larger asteroids. To find out if recent arrivals might have evidence of a water history, the researchers looked at uranium and thorium distributions in samples—the former is water-soluble while the latter is not. Logic suggests that if water ever existed in the [meteorite](#), it would have had to move as it melted, and that movement would be reflected in the distribution of thorium and uranium isotopes. Also, both isotopes have short half-lives, which means if their distributions in meteorites could be found, they would have occurred relatively recently—on the order of a few million years.

In studying nine of the meteorites, the researchers found the distributions they were looking for—a finding that suggested water had been moving due to melting, likely within the past 1 million years. The researchers suggest that not only could such meteorites have delivered [water](#) to Earth during the planet's formative years; they could also have been doing so in the much more recent past. They note that this idea could be tested by sampling asteroids before they strike the Earth, such as was done recently by Japanese and American spacecraft.

More information: Simon Turner et al. Carbonaceous chondrite meteorites experienced fluid flow within the past million years, *Science* (2021). [DOI: 10.1126/science.abc8116](https://doi.org/10.1126/science.abc8116)

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