Source : www.thehindu.com Date : 2018-12-20

# EVIDENCE OF WATER DISCOVERED IN 17 ASTEROIDS

Relevant for: Science & Technology | Topic: Space Technology & related matters

Image for representational purposes only | Photo Credit: AP

Japanese scientists have detected evidence of water in 17 asteroids for the first time using data from the infrared satellite AKARI.

This discovery will contribute to our understanding of the distribution of water in our solar system, the evolution of asteroids, and the origin of water on Earth, researchers said.

Our Earth is the only planet in our solar system where the presence of water on the planet surface has been confirmed. However, scientists are not yet sure how our Earth acquired its water. Recent studies have shown that other celestial bodies in our solar system have, or used to have, water in some form. Asteroids are considered to be one of the candidates that brought water to Earth.

Researchers from Japan Aerospace Exploration Agency (JAXA) and University of Tokyo found that water is retained in asteroids as hydrated minerals, which were produced by chemical reactions of water and anhydrous rocks that occurred inside the asteroids

Hydrated minerals are stable even above the sublimation temperature of water ice, according to the study which appears in the *Publications of the Astronomical Society of Japan*. By looking for hydrated minerals, scientists can investigate whether asteroids have water.

Infrared wavelengths contain characteristic spectral features of various substances, such as molecules, ice, and minerals, which cannot be observed at visible wavelengths. Therefore, it is indispensable to observe at infrared wavelengths for the study of solar system objects.

Hydrated minerals exhibit diagnostic absorption features at around 2.7 micrometres.

The Japanese infrared satellite AKARI, which was launched in February 2006 and ended operations in 2011, was equipped with the Infrared Camera (IRC) that allowed the researchers to obtain spectra at near-infrared wavelengths from two to five micrometres.

Using this unique function, spectroscopic observations of 66 asteroids were carried out and their near-infrared spectra were obtained. This provided the first opportunity to study the features of hydrated minerals in asteroids at around the wavelength of 2.7 micrometres.

The observations detected absorption, which were attributed to hydrated minerals for 17 C-type asteroids.

C-type asteroids, which appear dark at visible wavelengths, were believed to be rich in water and organic material, but the present observations with AKARI are the first to directly confirm the presence of hydrated minerals in these asteroids.

The heating energy could be supplied by the solar wind plasma, micrometeorite impacts, or the decay heat from radioactive isotopes in the rocks. This trend had been predicted by meteorite measurements, but this is the first time that it has been confirmed in asteroids.

Many C-type asteroids display this trend, suggesting that C-type asteroids were formed by the

agglomeration of rocks and water ice, then aqueous alteration occurred in the interior of asteroids to form hydrated minerals, and finally C-type asteroids were heated and dehydrated.

Fun facts or complex puzzles, science contains mysteries ranging from the minute to the magnificent. Taste science! Take this quiz!

Our existing notification subscribers need to choose this option to keep getting the alerts.

**END**