The Earth's core may be hiding dozens of hydrogen oceans.

New research suggests that the Earth's core contains an amount of hydrogen equivalent to 45 oceans, which could influence volcanic activity.

Recent experiments suggest that the Earth's core may contain up to 0.36% hydrogen by weight. If this enormous amount of hydrogen were to leak into the oxygen-rich mantle, it would create a massive reservoir of water.

According to research published on February 10 in the journal *Nature Communications* , scientists say that enough hydrogen to create **dozens of oceans** may have been "trapped" in the Earth's core during the planet's formation. These deep-seated reserves could directly influence processes occurring on the surface.

Geodynamicist Motohiko Murakami (ETH Zurich) explains: "Hydrogen doesn't exist as liquid water in the core. However, when it escapes upwards into the mantle and reacts with oxygen – the most abundant mineral element there – it transforms into water."

Direct research method

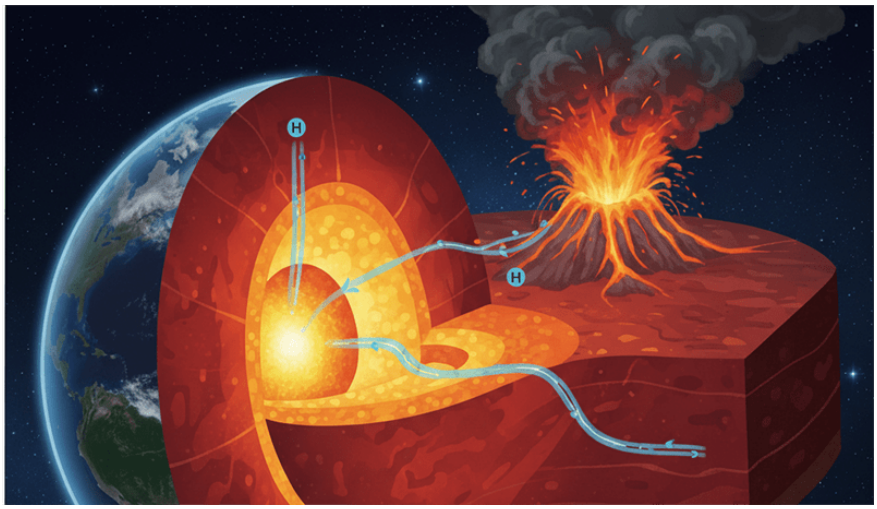
Previously, estimates of hydrogen reserves in cores were often based on indirect measurements and were highly variable. In this study, Murakami's team used a more direct approach:

Core simulation: They create artificial core fragments from iron, encased in a hydrogen-containing glass layer.

Extreme pressure and temperature: The test samples were pressed between two blocks of diamond and heated by laser to **4,826°C** . This simulated the conditions when the Earth's early core was a magma ocean.

Structural analysis: After rapid cooling, the research team used a special probe to map the elemental distribution. They discovered that silicon and hydrogen always exist together in an atomic ratio of 1:1.

Amazing result: 45 oceans of water



Based on this 1:1 ratio and previous geophysical observations (which indicated that the core contains 2-10% silicon by weight), the research team estimated that hydrogen accounts for approximately **0.07 to 0.36%** of the Earth's core weight.

Murakami stated, "This figure is equivalent to the amount of water in **9 to 45 oceans** combined."

Over time, some of this hydrogen may have leaked into the mantle and formed water. This water makes the rocks in the mantle more molten, creating magma and indirectly fueling volcanic eruptions on the Earth's surface.