Largest flow of natural hydrogen gas ever found measured in Albanian chromium mine

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Panorama of the Bulqizë ophiolite as seen from Batra's valley in Albania. Mining activity can be seen in the valley. Credit: L. Truche

A team of geologists affiliated with several institutions in France, working with a pair of colleagues from Albania, has measured the largest

natural flow of hydrogen ever in an Albanian chromium mine. In their study, reported in the journal *Science*, the group measured hydrogen gas bubbling up through liquid pools in the mine.

Hydrogen gas is colorless, odorless and extremely flammable. It has often been used as a fuel source. More recently, it has been considered as an alternative to carbon-based fuels because burning it does not produce any greenhouse gases.

Currently, hydrogen is obtained by capture it as it is released during natural gas extraction—it can also be produced through a variety of processes, many of which involve releasing greenhouse gases. A better approach, the researchers suggest, would be to tap natural hydrogen reserves, such as the one beneath the Bulqizë mine in Albania.

Prior research has shown that a large hydrogen reservoir lies beneath the mine in Albania, and it originated as a portion of the Earth's crust shifted millions of years ago, pushing it up and onto the crust next to it. The resulting stretch of land formed a type of rocky belt known as an ophiolite. Several such ophiolites have been discovered around the world, most of which are believed to house hydrogen reservoirs.

In this new study, the researchers responded to reports of large amounts of hydrogen seeping through vents and bubbling up in drainage pools in the mine; several explosions have been reported. They measured the seepage at multiple sites in the mine and used the results to produce an estimate of the total amount of hydrogen escaping—their numbers indicated that approximately 200 metric tons escape the mine every year, making it the largest natural flow ever documented.

The team of scientists exploring the mine galleries under the guidance of local miners. The team of scientists monitoring hydrogen concentration in the air of a mine gallery, and sampling gas seeping in the water draining stream. This gallery is located 1,000 m below the surface. Credit: F-V. Donzé

The research team concludes that new technology is required to take advantage of such reservoirs in order to capture vast amounts of hydrogen in a clean and economical way, perhaps reducing reliance on carbon-based fuels.

More information: Laurent Truche et al, A deep reservoir for hydrogen drives intense degassing in the Bulqizë ophiolite, *Science* (2024). DOI: 10.1126/science.adk9099

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