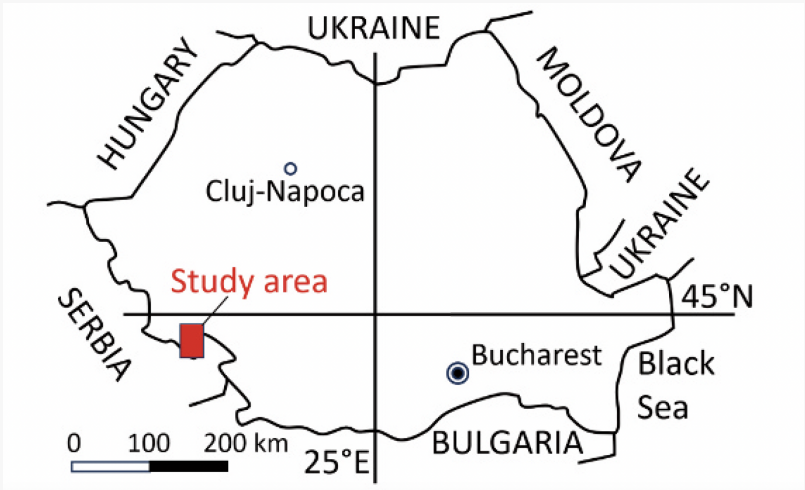
First Direct Evidence of a Natural Hydrogen Reservoir Found in Romania's Ophiolite Rocks

A scientific breakthrough has been made in Romania: hydrogen-rich, pressurized underground reservoir within ophiolite rocks found.

TIșOVIțA–IUțI, ROMANIA, May 30, 2025 /EINPresswire.com/ -- The discovery stems from a borehole drilled in the 1970s in the Tișovița–Iuți ophiolite, southwestern Romania. Originally intended for metal mining exploration, the well unexpectedly struck a pocket of pressurized gas at a depth of about 800 meters. The gas sample, analyzed at the time, revealed a remarkable composition: approximately 29% hydrogen and 69% methane, along with traces of heavier hydrocarbons and nitrogen, shows a study published by prof. Călin Baciu and CSI Giuseppe Etiope, in International Journal of Hydrogen Energy.

Local accounts recall a violent gas eruption and a fire that lasted several days, a testament to the reservoir's pressure and volume. Although technical data such as the exact pressure and flow rate were not recorded, the event provided a rare opportunity for scientists to study a natural hydrogen accumulation directly.



The location of the studied ophiolite


Measurement of Hidrogen by semiconductor sensor in Baia Nouă

Why Ophiolites Matter

Ophiolites are slices of oceanic crust and upper mantle rocks thrust onto continental crust. They are rich in peridotites, which, when altered by water through a process called serpentinization, can generate significant amounts of hydrogen. While surface seeps of hydrogen have been observed in ophiolite regions in Turkey and Albania, this Romanian site is the first where a subsurface, pressurized hydrogen reservoir has been directly encountered and documented1.

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Geological Model: How the Reservoir Formed
Researchers reconstructed the geological setting around the Tișovița borehole. The reservoir is believed to lie within a fractured, cataclastic dunite zone—rocks that were broken up by tectonic movements—near the contact between different peridotite layers. Above this, less-deformed, highly serpentinized dunite and impermeable tonalite veins acted as a natural seal, trapping the gas under pressure1.

This model mirrors mechanisms known from conventional oil and gas fields, where fractured rocks serve as reservoirs and less permeable rocks above act as cap rocks. The presence of methane and heavier hydrocarbons alongside hydrogen suggests long-term accumulation and complex chemical processes, such as Fischer–Tropsch-type reactions, have occurred in the subsurface.

Implications for the Hydrogen Economy
Natural hydrogen—sometimes called “white” or “gold” hydrogen—has emerged as a promising, carbon-free energy resource. Until now, most hydrogen used in industry has been produced synthetically, often with significant carbon emissions. The direct discovery of a natural, extractable hydrogen reservoir in Romania suggests that such resources could be more widespread and accessible than previously thought, especially in ophiolite-rich regions.

The Romanian case provides a conceptual model for future exploration: fractured, serpentinized peridotites as reservoirs, sealed by less-deformed or intrusive rocks. This could guide the search for natural hydrogen elsewhere, potentially accelerating the transition to cleaner energy sources.

Ongoing Research
Even decades after the initial drilling, hydrogen continues to leak from the old wellhead, with concentrations exceeding 100 parts per million in the air and measurable amounts in water samples. This persistent emission underscores the reservoir's significance and the need for further study and potential exploitation.

The accidental encounter with a hydrogen-rich reservoir in Romania's Tișovița–Iuți ophiolite marks a milestone in the global quest for sustainable energy, providing both a scientific model and a practical target for future exploration.

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