

Earthquakes trigger undersea methane reservoirs: study

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Seagulls fly over the Arabian Sea during sunset, in Mumbai on December 20, 2010. Earthquakes can rip open sub-sea pockets of methane, a highly potent greenhouse gas, according to a study by German and Swiss scientists published on Sunday.

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Quake-caused methane should be added to the list of heat-trapping [carbon emissions](#) that affect the world's [climate system](#), although the scale of this contribution remains unclear, they said.

The evidence comes from cores of sediment drilled from the bed of the northern Arabian Sea during a research trip by marine scientists in 2007.

One of the cores has now been found to contain [methane hydrates](#)—a solid ice-like crystalline structure of methane and water—only 1.6 metres (5.2 feet) below the sea floor.

Also uncovered were tell-tale signatures from water between [sediment grains](#), and concentrations of a mineral called barite.

Together, these suggested that methane had surged up through the [sea bed](#) in recent decades.

"We started going through the literature and found that a major earthquake had occurred close by, in 1945," said David Fischer from the MARUM Institute at the University of Bremen.

"Based on several indicators, we postulated that the earthquake led to a fracturing of the sediments, releasing the gas that had been trapped below the hydrates into the ocean."

Their search names the culprit as an 8.1-magnitude quake, the biggest ever detected in the northern Arabian Sea.

It ruptured a shallow gas reservoir at a location called Nascent Ridge, according to their paper, appearing in the journal *Nature Geoscience*.

Over a likely period of decades, around 7.4 million cubic metres (261 million cubic feet) of methane—equivalent roughly to 10 large natural-

gas tankers—belched to the surface, the authors calculate.

This estimate is conservative, they stress, adding that there could well be other sites in the area that were breached by the quake.

Greenhouse gases have both natural and man-made sources.

Identified natural sources include volcanic eruptions, which disgorge heat-trapping carbon dioxide (CO₂) as well as cooling sulphur dioxide particles, and methane from land and thawing permafrost.

The biggest human source is CO₂, from the burning of coal, gas and oil, and methane caused by deforestation and agriculture.

Methane has become a rising concern in the global warming equation because it is 25 times more effective than CO₂ in trapping solar heat, although it is also shorter-lived.

According to estimates published last week in *Nature*, the leakage of 50 billion tonnes of [methane](#) from the thawing shoreline of the East Siberian Sea—part of the Arctic Ocean, which is one of the Earth's hot spots for warming—would inflict costs almost as big as the world's entire economic output.

More information: *Nature Geoscience* [DOI: 10.1038/ngeo1886](https://doi.org/10.1038/ngeo1886)

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