

# CO2 injections likely culprit in Texas earthquakes -study

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(Reuters) - Carbon dioxide injected into oil and gas wells may have caused a series of minor earthquakes in Texas long before the adoption of current hydraulic fracking, according to a study published on Monday in a national science journal.

The study, which analyzed 93 earthquakes that occurred between March 2009 and December 2010, appears to be the first to link earthquakes of magnitude 3 and above and carbon dioxide injections in the Cogdell oil field near Snyder, Texas.

Tremors in the area that occurred between 1975 and 1982 were previously linked to the injection of water into wells but the same explanation could not be applied to earthquakes that occurred in late 2000s, the paper's two authors said.

"The timing of gas injection suggests it may have contributed to triggering the recent seismic activity," the study said. "If so, this represents an instance where gas injection has triggered earthquakes having magnitudes 3 and larger."

The paper, authored by Wei Gan of the [China](#) University of Geosciences in Beijing and Cliff Frohlich of University of Texas in Austin, was published in the Proceedings of the National Academy of Sciences. It relied on data gathered by six temporary seismograph stations that were a part of the USArray program.

Recent studies, including a 2012 paper by one of the authors, have linked fracking and wastewater disposal wells to increased seismic activity in places like the Barnett Shale in northern Texas and central Oklahoma.

This is the first publication to hint at a direct link between enhanced oil recovery and seismic activity in Texas.

Carbon dioxide is injected into wells nearing the end of life to enhance their output. It is a technique that is mostly used in mature oil fields such as the Cogdell field, one of the 7,000 oil fields that make up the Permian Basin in West Texas.

Oil companies like Occidental Petroleum have extensive carbon dioxide injection projects in the field. In fact, Occidental's website says nearly 60 percent of its oil production in West Texas and southeast New [Mexico](#) comes from Carbon-dioxide flooding.

The abstract of the latest study can be found at: [bit.ly/HCXXxp](http://bit.ly/HCXXxp) – abstract below (subscription required for pdf)

## Gas injection may have triggered earthquakes in the Cogdell oil field, Texas

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1. Edited by Donald W. Forsyth, Brown University, Providence, RI, and approved October 4, 2013 (received for review June 13, 2013)

## Significance

Between 2006 and 2011 a series of earthquakes occurred in the Cogdell oil field near Snyder, TX. A previous series of earthquakes occurring 1975–1982 was attributed to the injection of water into wells to enhance oil production. We evaluated injection and extraction of oil, water, and gas in the Cogdell field. Water injection cannot explain the 2006–2011 earthquakes. However, since 2004 significant volumes of gas including CO<sub>2</sub> have been injected into Cogdell wells. If this triggered the 2006–2011 seismicity, this represents an instance where gas injection has triggered earthquakes having magnitudes 3 and larger. Understanding when gas injection triggers earthquakes will help evaluate risks associated with large-scale carbon capture and storage as a strategy for managing climate change.