

Anticipating hazards from fracking-induced earthquakes in Canada and US

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As hydraulic fracturing operations expand in Canada and in some parts of the United States, researchers at the 2017 Seismological Society of America's (SSA) Annual Meeting are taking a closer look at ways to minimize hazards from the earthquakes triggered by those operations.

Hydraulic fracturing, or fracking, is a method of hydrocarbon recovery that uses high-pressure injections of fluid to break apart rock and release trapped oil and natural gas. At the SSA Annual Meeting, experts will speak about the growing recognition that hydraulic fracturing or fracking can produce earthquakes magnitude 3 and larger, acknowledging that this type of seismic activity is difficult to predict and may be difficult to stop once it begins.

Most induced earthquakes in Canada have been linked to hydraulic fracturing, in contrast to induced earthquakes studied in the central and eastern United States. In the U.S., these earthquakes have been linked primarily to massive amounts of wastewater injected back into the ground after oil and gas recovery. However, some presentations at the SSA meeting will take a closer look at the possibilities for fracking earthquakes in the United States.

Michael Brudzinski of Miami University and his colleagues will discuss their work to identify swarms of small magnitude earthquakes in Ohio that appear to be correlated in time and space with hydraulic fracturing or wastewater disposal. Their work suggest that there are roughly three times more [earthquake](#) sequences of magnitude 2 or larger induced by

hydraulic fracturing compared to wastewater disposal in the area—even though there are about 10 times more [hydraulic fracturing wells](#) than wastewater disposal wells. Their technique, they say, provides evidence of induced seismicity from hydraulic fracturing in Oklahoma, Arkansas, Pennsylvania, West Virginia and Texas as well.

Zenming Wang and colleagues are preparing for the onset of oil and gas exploration in the Rome Trough of eastern Kentucky, conducting a study of the natural background seismicity in the area to be able to better identify induced earthquakes if they occur. In their SSA presentation, they will also discuss how an area like eastern Kentucky might assess and prepare for ground shaking hazards from induced earthquakes, since the ruptures may occur on unmapped or "quiet" faults.

In western Alberta and eastern British Columbia in Canada, a significant increase in the rate of felt earthquakes from [hydraulic fracturing](#) has researchers looking at ways to mitigate potential damage to infrastructure in the region. In her SSA presentation, Gail Atkinson of Western University will discuss the factors that affect the likelihood of damaging ground motion from fracking-induced earthquakes. Based on these factors, Atkinson proposes targeted "exclusion zones" with a radius of about five kilometers around critical infrastructure such as major dams. This would be combined real-time monitoring to track the rate of seismic events of magnitude 2 or greater within 25 kilometers, with fracking operations adjusted to potentially reduce this rate to less hazardous levels.

More information: "Correlation Algorithms to Better Characterize Seismicity Induced by Hydraulic Fracturing" will be presented at the SSA Annual Meeting on Wednesday, April 19. All presentation abstracts for the 2017 SSA Annual Meeting can be accessed at meetings.seismosoc.org/abstracts

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