Geology; Researchers from Southern Methodist University Discuss Findings in Geology (Spectral Characteristics of Ground Motion From Induced Earthquakes In the Fort Worth Basin, Texas, Using the Generalized Inversion Technique)

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2020 NOV 6 (NewsRx) -- By a News Reporter-Staff News Editor at Science Letter -- Investigators publish new report on Geology. According to news originating from Dallas, Texas, by NewsRx correspondents, research stated, "A generalized inversion technique (GIT) is applied to local seismic data from 90 induced earthquakes (M-L 2.0-3.9) in the Fort Worth Basin (FWB) of north Texas to separate path, site, and source characteristics and to improve local seismic hazard assessment. Seismograms from three earthquake sequences on spatially separated basement faults are recorded on 66 temporary stations."

Funders for this research include Roy M. Huffington Department of Earth Sciences at Southern Methodist University (SMU), Texas Seismological Network (TexNet) program at the **Bureau of Economic Geology**, University of Texas, National Science Foundation, Department of Energy (DOE) National Nuclear Security Administration, Seismological Facilities for the Advancement of Geoscience and EarthScope (SAGE) Proposal of the National Science Foundation.

Our news journalists obtained a quote from the research from Southern Methodist University, "Because of the lack of hard-rock recording sites within the sedimentary basin, we developed a site correction method for the appropriate GIT process. At about 30 km distance from the hypocenters, we observed a change in spectral attenuation and thus focus data analysis within this distance range. The estimated quality factors for S and P waves result in a Q(S) that is larger than Q(P) which we interpret as a result of concentrations of crustal pore fluids or partial fluid-saturated material along the path; an interpretation consistent with fluid-rich sedimentary rocks in the FWB. Strong site amplifications as much as five times on horizontal components reflect the thick sediments in the basin. A limited number of sites exhibit amplification or deamplification on the vertical component that limits the use of horizontal-to-vertical spectral ratio methods for characterizing the site effect relative to the site effects estimated by GIT. Stress drops for all earthquakes range from 1.18 and 21.73 MPa with a mean of 4.46 MPa, similar to values reported for tectonic intraplate events. The stress-drop values suggest that strong motion and seismic hazard from the injection-induced earthquake in the FWB are comparable to those for tectonic earthquakes."

According to the news editors, the research concluded: "The strong site amplification and fluid effects on propagation attenuation may be crucial factors to take into account for estimating seismic hazards of induced earthquakes in sedimentary basins."

This research has been peer-reviewed.

For more information on this research see: Spectral Characteristics of Ground Motion From Induced Earthquakes In the Fort Worth Basin, Texas, Using the Generalized Inversion Technique. Bulletin of the Seismological Society of America, 2020;110(5):2058-2076. Bulletin of the Seismological Society of America can be contacted at: Seismological Soc Amer, 400 Evelyn Ave, Suite 201, Albany, CA 94706-1375, USA.

The news correspondents report that additional information may be obtained from SeongJu Jeong, Southern Methodist University, Dept. of Earth Sciences, Dallas, TX 75205, United States. Additional authors for this research include Brian W. Stump and Heather R. DeShon.

Keywords for this news article include: Dallas, Texas, United States, North and Central America, Geology, Southern Methodist University.

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