Physics - Geophysics; Studies from Texas A&M University Yield New Information about Geophysics (New Insights Into the Mechanisms of Seismicity In the Azle Area, North Texas)

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2020 JAN 28 (VerticalNews) -- By a News Reporter-Staff News Editor at Physics Week -- Current study results on Physics - Geophysics have been published. According to news reporting originating in College Station, Texas, by VerticalNews journalists, research stated, "We have performed a site-specific study of the mechanics of induced seismicity in the Azle area, North Texas, using a coupled 3D fluid flow and poroelastic simulation model, extending from the overburden into the crystalline basement. The distinguishing feature of our study is that we account for the combined impact of water disposal injection and gas and water production on the pore pressure and stress distribution in this area."

Financial supporters for this research include Texas A&M University Joint Industry Project, Model Calibration and Efficient Reservoir Imaging (MCERI), Texas Seismic Network (TexNet) program at the Bureau of Economic Geology, the University of Texas at Austin.

The news reporters obtained a quote from the research from Texas A&M University, "The model is calibrated using observed injection wellhead pressures and the location, timing, and magnitude of seismic events. We used a stochastic multiobjective optimization approach to obtain estimated ranges of fluid flow and poroelastic parameters, calibrated to the pressure, rate, and seismic event data. Mechanisms for induced seismicity were examined using these calibrated models. The calibrated models indicate no fluid movement or pressure increase in the crystalline basement, although there is plastic strain accumulation for the weaker elements along the fault in the basement. The accumulation of strain change appears to be caused by the unbalanced loading on different sides of the fault due to the differential in fluid injection and production. Previous studies ignored the produced gas volume, which is almost an order of magnitude larger than the produced water volume under reservoir conditions and which significantly impacts the pore pressure in the sedimentary formations and the stress distribution in the basement. A quantitative analysis indicates that the poroelastic stress changes dominate in the basement with no noticeable change in pore pressure."

According to the news reporters, the research concluded: "Even though the low-permeability faults in the basement are not in pressure communication with the Ellenburger formation, the poroelastic stresses transmitted to the basement can trigger seismicity without elevated pore pressure."

For more information on this research see: New Insights Into the Mechanisms of Seismicity In the Azle Area, North Texas. Geophysics, 2020;85(1):EN1-EN15. Geophysics can be contacted at: Soc Exploration Geophysicists, 8801 S Yale St, Tulsa, OK 74137, USA.

Our news correspondents report that additional information may be obtained by contacting A. Datta-Gupta, Texas A&M University, Harold Vance Dept. of Petroleum Engineering, College Stn, TX 77843, United States. Additional authors for this research include R.Q. Chen, X. Xue, J. Park and M.J. King.

Keywords for this news article include: College Station, Texas, United States, North and Central America, Geophysics, Physics, Texas A&M University.

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