The Effect of Fracking on Thermal Conductivity and Seismic Wave Transmission

Miller, Jett (School: Saginaw Arts and Sciences Academy)

Over the past 50 years, the use of hydraulic fracturing or fracking has increased as the demand for fossil fuels has increased and the process is more efficient at extracting oil and natural gas from wells. Fracking is a process of injecting liquids at high pressure to extract oil and natural gas. Methanol and ethylene glycol are two harmful chemicals that are found in fracking fluid. The question being asked is does fracking impact the thermal conductivity and seismic activity in three different rock types: sandstone, limestone, and granite. There are two hypotheses in this experiment. The first hypothesis is that the addition of ethylene glycol and methanol will cause a change in the thermal conductivity in sandstone, limestone, and granite. The second hypothesis is that the addition of ethylene glycol and methanol will cause a change in the seismic wave transmission in sandstone, limestone, and granite. Eight trials were conducted for each rock type and each condition to measure temperature change every 5 minutes over a 60 minute time period and to measure acceleration change in terms of X-axis, Y-axis, and Z-axis every 0.5 seconds for 5 seconds. An analysis of variance (ANOVA) was conducted to statistically compare the mean and standard deviations of each condition for each rock type. Although significant differences were found in some experimental groups having added methanol or ethylene glycol, both hypotheses in this experiment were not supported as significant differences were not found in all three types of rock.

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