Earthquakes ROCK: Preliminary Data from a Manipulated Model to Show the Newton Force of Different Bedrock Types and Their Relationship with Induced Earthquakes in Kansas

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In Kansas, there has been an exponential increase in the number of earthquakes. A factor of 21 in 2013 to 659 in 2014, and 448 in 2015. It is vital that we understand why this increase is occurring—The injection of waste water from oil wells. This water is injected into the Arbuckle layer of Kansas and Oklahoma, where dolomite, shale, and granite bedrock types exist. Using a manipulated earthquake demo model, different bedrock types were tested. For this project, I used combinations of dolomite, shale, and granite. My hypothesis states “If a granite rock slips on another granite rock, then it will produce more Newton Force than other bedrock combinations.” The model involves setting a rock on top of another rock, and then pulling the top rock with a force meter, which was hooked to two rubber bands, used as a tension spring. The Granite/Shale combination had the highest mean Newton Force of 16.08 N. The Granite/Granite combination was in third with mean 14.72 N. An unpaired t-test and an ANOVA were used for statistical analysis. The t-test showed that most of the combinations were extremely statistically significant. The ANOVA showed that some of the dolomite combinations were not statistically significant with other combinations. In conclusion, the hypothesis was not supported because the shale/shale and shale/granite forces were higher. This preliminary data could be applied to project the force exerted by an earthquake and applied to the Richter scale.

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