A study was conducted on the relationship between the electrical conductivity and physical properties of boise, berea, silurian dolomite, and indiana limestone cores. The different physical properties of the cores produced individual relationships with their electrical conductivity. All the cores were saturated with a 35 ppt solution of NaCl to simulate the salinity of seawater, and then exposed to an electrical current to measure the magnitude of its conductivity. Berea sandstone, Indiana limestone, and silurian dolomite went from high conductivity to low conductivity respectively. Through examination of the samples, the porosity of the cores had no clear trend that would relate to its electrical conductivity.

In the application of [water] through the core via a variation of constant flows, there has yet to be a clear relationship between permeability and electrical conductivity.

Pore structures:

Mineral composition:

Overall Results:

Understanding the effects of a rock's physical properties on its conductivity , will ultimately help people deduct what is underneath the surface without drilling. Gathering subsurface data from electrical currents may be a more time efficient, cheap, and environmentally friendly; however, further research is required.

**Project Abstract**

The goal of our research was to determine the relationship between physical properties and possible states of a rock and its electrical conductivity. This relationship can allow us to deduce reservoir properties without having to take out samples. Relationships between permeability, percent of pore volume filled (saturation), chemical nature of the brine and core samples ,and the core’s electrical conductivity were explored. We found a proportional relationship between permeability, amount saturated and electrical conductivity. [Which solution will conduct electricity better?] [Do rocks that dissolve conduct electricity better?] Gathering subsurface data from electrical currents may be a more time efficient, cheap, and environmentally friendly; however, the relationship we established are very loose. Previous research states that samples from the same place can have large variability in physical properties like permeability, so our lack of samples makes our relationship less accurate.

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