Elastic wave velocities and electrical conductivity in a brine-saturated chert

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Geophysical mapping of fluids is critical for understanding crustal processes. Seismic velocity and electrical resistivity structures have been revealed to study the fluid distribution. However, the fluid distribution has been still poorly constrained. Observed velocity and resistivity should be combined to make a quantitative inference on fluid distribution. The combined interpretation requires a thorough understanding of velocity and resistivity in fluid-saturated rocks. We have studied elastic wave velocities and electrical conductivity in a brine-saturated chert to understand the connectivity of pores at low porosity.

A fine grained chert (Kyoto Pref., Japan) was selected as a rock sample for its low porosity. The rock sample was mostly composed of quartz. Circular disks (D=10 mm, L=3 mm) were cut from the rock sample, and the compressional and shear wave velocities were measured to estimate the crack density. Disc samples were filled with 0.1 M KCl aqueous solution, and the electrical conductivity was measured at ambient conditions with the two-electrode method. The relation between the crack density and electrical conductivity will be presented in our poster.

Keywords: elastic wave velocity, electrical conductivity, fluid

