

How to image the non-volcanic deep aquifer by Seismic and ElectroMagnetic ACROSS

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Imaging of aquifers in the crust can be understood with discriminating the state of water as an supercritical or not. The key parameters are obviously the distribution of electrical conductivity as well as the elastic impedance and dispersion of aquifers. So, the imaging of such heterogeneous distribution of physical properties in the crust should be made as clear as possible. In order to realize these imaging, both Seismic and Electromagnetic (EM) ACROSS techniques are most promising at this moment.

We have developed an active monitoring system named the ACROSS (Accurately Controlled Routinely Operated Signal System) in which a tensor transfer function with highly reliable error estimation. This approach will be the best way to discriminate very small temporal changes of the physical properties (material dispersion) and heterogeneous structures in the crust, by utilizing both Seismic- and EM-ACROSS.

Recent studies suggested the remarkable anomalous slow slip and strong seismic reflections beneath the Tokai region, central Japan, where many large interplate earthquakes repeatedly occurred. We have conducted the ACROSS array observation in Tokai region for 11 months using continuous seismic ACROSS signals.

Although results preliminary obtained by the EM-ACROSS indicate that the modeling of scattered wave may need more observation sites as well as the longer duration of continuous observation.