

## Sources of self-potential variations associated with Nojima water injection tests

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The repeated water injection experiments have been done at Nojima fault since 1997 to study the properties and healing processes of the fault. The Nojima fault is the surface fault rupture of the Hyogoken-Nanbu Earthquake (Mw6.9) of 1995. We measured self-potential variations associated with water injection experiments using 1800m borehole. The following three characters of self-potential variations were observed in common with the repeated water injection experiments during 1997 to 2003 : 1) self-potential variations appeared to correspond to the operation of water injections, 2) these variations were observed at all the observation sites around the water injection borehole, 3) the negative voltage appeared around the water injection borehole. Observed self-potential variations are explained with an electrokinetic effect due to the subsurface fluid flow of the injected water. The charge in voltage in the aquifer is conducted to the whole part of the injection well through the highly conductive iron casing pipe. The iron borehole pipe acts as a line source of electric current. However, after 2004 water injection experiments the positive voltage appeared on the far side from the borehole. The local positive voltage is not explained by the above model. In this paper, we report a new model, which consists of the line source model and a dipole source, to explain the observations and its problems.

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