

# **ELECTRIC FIELD VARIATIONS GENERATED BY GROUND MOTION AND THEIR APPLICATION TO GROUNDWATER RESEARCH**

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Clear examples of electric field variations have been obtained in association with ground motion due to the passage of seismic waves. Such electric field variations have been interpreted mostly in terms of the so-called electrokinetic effect, as well documented in quite a few papers. Recently we found circularly polarized electric fields in association with natural and artificial (blasting) earthquakes in Japan and proposed another mechanism of electric field generation, which we call the seismic dynamo effect. This may be regarded as an extended model of the induction effect. In this model we consider ions motion in pores filled with groundwater, which is driven by ground motion in the Earth's magnetic field. This model is capable of showing the possibility of circular polarization of electric field when the resonance is realized between the frequency of ground velocity and the cyclotron frequency of ion, such as  $\text{HCO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ , etc. contained in pores, for the Earth's magnetic field at the observation site. Ions with negative charge show the circular polarization with polarity opposite to that for ions with positive charge. In the observations, circular polarizations with opposite polarities have also been found. An application of this model would be possible for groundwater research in relation to environmental researches. Concentration of specific ions in groundwater would be examined if experiments are properly designed in the field.

electric field, ground motion, groundwater

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