

SEM031-P06

Room: Convention Hall

Time: May 26 17:15-18:45

Some characteristics of electric field variations generated by ground velocity due to blasting (2)

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Some characteristic variations in the electric field on the surface of the Earth as observed in association with earthquakes have been well interpreted in terms of the so-called seismic dynamo effect. We have been continuing observational studies to confirm the mechanism whenever observations are possible; in fact, we have made seismic and electric observations during blasting in various places in Japan. In 2009, some blasting experiments were available and at three sites we could obtain some interesting results. So far, the sampling interval for recording was set at 200 Hz, but this turned out to be insufficient in the cases of blasting; in fact, the dominant frequencies of ground velocity were about 30 Hz. So we changed the sampling interval to 1,000 Hz and we could obtain clearer records of ground velocity and electric field. The results are summarized as follows. In two cases, left-circular polarization was found and interpreted as reflecting the response of Na ion in groundwater to the ground velocity. It should be remembered here, that the cyclotron frequency of Na ion for the magnetic field of the Earth at the observation sites is about 30 Hz and hence a resonant-like behavior is expected in the electric field generated by the ground motion under the magnetic field of the Earth. In all the cases, electric field variations started a little bit earlier than the arrival of seismic wave at the observation sites. If we combine all the results which we obtained so far, such circular polarization and earlier arrival are commonly observed, confirming the mechanism of seismic dynamo effect.

Keywords: seismic dynamo effect, seismic wave, electric field