

## 自然地震及び人工地震における電場と速度場の変換関数の特徴

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## Characteristics in transfer functions of electric field and ground velocity for natural and artificial earthquakes

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We have shown some evidence showing the resonance between the motion of ion and the magnetic field of the Earth. The most striking feature is circular polarization of electric field as often observed in artificial earthquakes due to blasting as well as natural earthquakes. Another feature is peaks in transfer function at frequencies corresponding to the resonance frequencies of some ions, prevailing in groundwater, for the vertical component of the magnetic field of the Earth. In this respect, we already showed one notable example for aftershocks of the earthquake of magnitude 6.9 (JMA), which occurred in 2007 off the coast of the Noto Peninsula. In natural earthquakes, however, significant transfer function estimates are possible only for frequencies lower than 30 Hz or so. Higher frequency components have been obtained for recent artificial earthquakes, after we introduced 1 kHz sampling data loggers. It is shown then that the resonance also occurs at frequencies higher than 30 Hz, but the reliability of transfer function estimates is rather poor because stacking usually required for statistical properties is not possible for artificial earthquakes due to blasting. The examples which we have so far obtained are in good agreement with transfer functions theoretically expected, but we should be careful for cases in which dominant peaks do not appear in transfer functions. Aftershocks of the 2008 Iwate-Miyagi Inland earthquake of magnitude 7.2 are one example of such a case. In fact, no dominant peaks are found in spite of sufficient stacking of transfer function estimates for many aftershocks. Also transfer function estimates are not stable, varying from one dataset to another. We ascribe such characteristics to the possibility that electric field generation may be occurring in a deep zone as well as a surface zone. In fact, we already found earlier arrival of electric field together with simultaneous arrival. The observed electric field is superposition of these electric fields and their correlation with ground velocity at the surface is not always good enough for transfer function estimation.