

SEM031-P04

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Enhancement of co-seismic piezomagnetic signals due to non-uniform magnetization in the Earth's crust

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We presented a scheme of calculating piezomagnetic signals accompanying with seismic wave propagations over the non-uniformly magnetized crust, and performed examples of calculations. Calculation of co-seismic piezomagnetic signals involves the three dimensional volume integrals even if the structure of magnetization is two dimensional, making the calculation laborious. However we can simplify the calculation by considering the Fourier Transform of the spatial distribution of signals. A calculation is performed both for non-uniformly and uniformly magnetized crust with intensity of 10 A/m. Piezomagnetic signals arising from uniformly magnetized crust are up to 0.02 nT, whereas maximum amplitude of piezomagnetic signals arising from non-uniformly magnetized crust are as large as 0.1 to 0.2 nT. This implies that the piezomagnetic field can be a generating mechanism of the co-seismic changes in the magnetic field with detectable amplitudes, if the magnetization of the crust is relatively high.

Keywords: geomagnetic field, piezomagnetic effect, magnetic anomaly, Fourier Transform, Rayleigh wave