

SEM037-P01

会場:コンベンションホール

時間:5月26日14:00-16:30

地震波伝搬にともなうピエゾ磁気効果の大きさに対する電気伝導度の影響 Piezomagnetic fields arising from the propagation of teleseismic waves in magnetized crust with finite conductivity

山崎 健一^{1*} Ken'ichi Yamazaki^{1*}

¹ 京都大学防災研究所 ¹DPRI, Kyoto Univ.

To determine whether the piezomagnetic effect is a plausible mechanism in explaining variations in the magnetic field that occur synchronously with the propagation of teleseismic waves, a set of solutions are derived for the electromagnetic field. The situation is considered in which the Earth's conductivity has a stratified structure and seismic waves are expressed as a plane wave. The piezomagnetic field in this situation is expressed by an analytically closed form. Using the obtained solution, quantitative aspects of the piezomagnetic field that accompanies seismic Rayleigh waves with an amplitude of 1 cm are discussed. It is shown that the finite conductivity of the Earth's crust sometimes acts as an enhancer of the magnitude of the piezomagnetic field is substantially small. Even in the case that the initial magnetization around the observation site is as large as 5 Am^{?1}, the expected amplitudes in the piezomagnetic field are at most 0.1 nT. This result means that the piezomagnetic effect is not a reasonable mechanism to sufficiently explain variations in magnetic fields that occur synchronously with ground motions, if the initial magnetization is horizontally uniform.

キーワード: レイリー波, ピエゾ磁気効果, 電気伝導度, 電磁場変動, 増幅

Keywords: Rayleigh wave, piezomagnetic effect, electrical conductivity, electromagnetic field, enhancement