Examination of Estimation of Geomagnetic Changes Using Deep Learning Technology

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Electromagnetic changes associated with earthquakes have been investigated previously. In our research, we have employed the magnetometers for seismomagnetic observations. We have reported successful observation of "co-faulting" Earth's magnetic field changes. The Magnetic fields began to change almost simultaneously with the onset of the earthquake rupture and grew before the first P wave arrival. Such magnetic signals are most probably generated by the changing stress field due to earthquake rupturing, i.e. the piezomagnetic effect. On the other hand, this observation result suggested that the geomagnetic variation signal accompanying fault movement, whose sources are the piezomagnetic effects, is very small.
To discuss a feasibility of a new system for a super-early warning of destructive earthquakes using measurement of EQ-piezomagnetic effects, we have important problems to be solved. Then we examine an estimation method of geomagnetic changes using deep learning technology. This technology is also applied to speech processing, image processing, or analysis method of financial fields. In this study, we investigate the estimation of geomagnetic field changes using magnetic signals observed from multiple points. We show the estimation results using deep learning technology and the future works for detecting the local geomagnetic changes.

Keywords: estimation of geomagnetic field, deep learning