ON UPPER BOUNDS OF IN SITU PIEZOMAGNETIC STRESS SENSITIVITY IN THE EARTH'S CRUST – A CASE OF THE MW6.6 NOTO EARTHQUAKE 2007, JAPAN

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The piezomagnetic effect is changes in the magnetization in ferromagnetic minerals under application of mechanical stresses. Although many laboratory experiments have been carried out, some studies have pointed out that in situ values of the stress sensitivity, which is the proportional coefficient between applied stress and magnetization change, is different from those in the actual crust. In the present study, we have tried to determine in site stress sensitivity by using the continuous record of the magnetic field measurements at the time of the 2007 Noto Hanto earthquake (Mw 6.6), which is one of the major intra-plate earthquakes in Japan. Variations in the geomagnetic field near the epicenter of the earthquake have been recorded by more than one magnetometer, which gives us an opportunity to compare theoretical and observational values of the piezomagnetic signals accompanied with the stress changes due to the earthquake. A simulation predicts that the changes in the geomagnetic total intensity values larger than 1.0 nT should be observed if the sensitivity is up to 1×10^{-2} MPa^{-1}. On the other hand, a data examination confirms that the co-seismic changes are less than 1.0 nT if they exist. The absence of expected co-seismic signals in the actual geomagnetic record suggests that *in situ* stress sensitivity in this area is smaller than the value assumed in the calculation. Some of earlier studies have already suggested that the stress sensitivity tends to be small for the co-event variations, but they have not covered whole types of phenomena. The result of the present study indicates that the stress sensitivity for intra-plate earthquakes with recurrence time of several thousand years is also small.

piezomagnetic effect, stress sensitivity

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