

Application of magneto-impedance sensor to geomagnetic field measurements

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Magneto-impedance (MI) effect was discovered about 25 years ago and a micro-size magnetic sensor that utilizes this effect becomes commercially available. We made some modifications to the commercially available MI sensors as they can cover the range of the geomagnetic field. For the period of March 30 to April 27, 2018, we conducted experimental observations of geomagnetic field variations with the MI sensors at Mineyama observation site, which is located about 100 km north-west of Kyoto. Data obtained with the MI sensors were compared with those from the fluxgate magnetometer that has been working at the site. Results showed that the MI sensor recorded geomagnetic variations with amplitudes of ~1 nT that were also detected with the fluxgate magnetometer. This suggests that MI sensors are useful for researches in geomagnetism or space physics, although they are much less expensive than fluxgate magnetometers.

We consider developing two different kinds of systems to measure the geomagnetic field using the MI sensor: a system for ground-based observation and a system for a sounding rocket. In presentation, we will display observation data from the MI sensors and the fluxgate magnetometers at Mineyama and other observatories. Future plans of the system onboard sounding rocket will be also presented and discussed.