

Application of Magneto-Impedance Sensor to Geomagnetic Field Measurements for Constructing Distributed Arrays of Small Instruments (DASI)

*Nomura Hiroshi¹, Masahito Nosé¹, Hitoshi Aoyama², Takeshi Kawano², Masafumi Hirahara¹

1. Institute for Space-Earth Environmental Research, Nagoya University, 2. Aichi Steel Corporation

Magneto-impedance (MI) effect was discovered about 25 years ago and micro-size magnetic sensors that utilizes this effect become 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. Furthermore, MI sensors are much less expensive than fluxgate magnetometers.

We are developing a low-cost system to measure the geomagnetic field using the MI sensor. This system includes a Raspberry Pi, a commercially available AD converter, and power supply circuits for generating a stable power supply voltage. In presentation, we will show observation data from this system and discuss the possibility of using this system in Distributed Arrays of Small Instrument (DASI).

Keywords: Geomagnetic Field Measurements, Magneto-Impedance Sensor, Raspberry Pi, Distributed Arrays of Small Instruments (DASI)