

Ground calibration experiments of Magnetic field experiment on the ERG satellite

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The Arase (ERG) satellite was launched on 20 December 2016 to study plasma process in the inner magnetosphere. The Magnetic field experiments (MGF), which is one of the scientific experiments onboard the Arase satellite, observes the background magnetic field and its low frequency fluctuations. The MGF has a set of tri-axis ring-core type fluxgate sensors (MGF-S) to observe the magnetic field in the inner magnetosphere. For accurate measurements of the magnetic field vector along the Arase orbits, ground calibration experiments of MGF-S are needed.

We have been performed in order to determine the sensitivity and alignment via ground calibration experiments. From response of MGF-S to known applied magnetic field, we determined the sensitivity of each axis and found that the error of the sensitivity is less than 0.06%. The axis of the sensor is orthogonal to each other within 0.95 degrees. The estimated error of alignment is within 0.07 degrees. We also have examined the temperature dependence of the sensitivity and offset. The sensitivities relative to the room temperature have linearity with the standard error less than 0.0016, while the offset of the sensors have no clear linearity but reproducibility against temperature. From these ground examinations, the determination accuracies of the amplitude and direction of the magnetic field observed by the MGF will satisfy the science requirements for the Arase observations. In this presentation, we will also evaluate and show measurement error of MGF-S along the Arase orbit.

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