Summary of "Research on reducing the frequency of absolute magnetic observations"

This special issue reports the research results for the Kakioka Magnetic Observatory primary research project carried out during FY2011 entitled "Research on reducing the frequency of absolute magnetic observations."

In this research, we improved the technique for baseline determination with absolute magnetic observations and investigated the impact of expanding the interval between absolute observations on baseline accuracy and on the frequency of re-observations. Baseline determination performance of the advanced method was sufficiently improved that the frequency of absolute observations could be reduced from weekly to bi-weekly. We also established a method to correct for the influence of artificial disturbances on absolute measurements. Furthermore, we carried out test absolute observations at intervals of 7, 10, and 14 days to confirm the validity of baselines determined from absolute observations made at different intervals and observers.

In 2012, after the completion of this research, the frequency of absolute magnetic observations at Memambetsu and Kanoya was reduced from weekly to bi-weekly.

The following four papers, describing the development of the new technique, are reported in this issue. The results of the test observations will be reported after the next issue.

1. Fukui, K., T. Owada and K. Morinaga, **Advanced method to predict variations of baseline values of absolute magnetic observations and frequency of re-observations**

This study proposes an advanced method of baseline estimation that takes into account soil temperature. This method produces good results even if the interval between absolute measurements is extended while the frequency of re-observations is not increased compared with their frequency when absolute measurements are performed weekly.

2. Owada, T., T. Moriyama and K. Morinaga, **Effect of environmental data on baseline values - comparison between main and sub-magnetometers**

The baseline values of the main and sub-magnetometers were calculated by considering the effects of soil temperature, tilt, and sensor temperature. The results show that the time variations of the corrected baselines were stable and consistent among the baselines of the main and sub-magnetometers.

3. Tokumoto, T., F. Muromatsu and Y. Ikoma, **Detecting artificial magnetic disturbances at Memambetsu and Kanoya magnetic observatories**

We used a model to evaluate the capability of the monitoring system for geomagnetic disturbances used at Memambetsu and Kanoya to detect human-caused disturbances. The monitoring system consists of five 3-component fluxgate magnetometers and three proton (Overhauser) magnetometers. If the source of the artificial disturbance is located nearby the measurement site, we can estimate the source parameters. The detectability is low for the source situated in the south of Kanoya and in the north of Memambetsu.

4. Morinaga, K., S. Nagamachi, Y. Ikoma and T. Owada, **Absolute magnetic observation influenced by artificial disturbances at Kanoya - occurrence status and correction method**

Human-caused disturbances occurring during the performance of absolute measurements are reported for the period from April 2011 to March 2012 at Kanoya, and a method to reduce the influence of such disturbances on the observed baseline values is introduced.