Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

MTT06-P01 Room:Convention Hall Time:May 24 17:15-18:30

Magnetic observations at Syowa-Iceland conjugate stations

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Long-term variations of the magnetic parameters (declination, inclination, total force) and magnetic variations expressed with the K-indices at the geomagnetic conjugate stations, Leirvogur in Iceland and Syowa Station in Antarctica, and their relationship with the solar activity and solar wind parameters are analyzed.

Keywords: ground-based magnetic observation, geomagnetic conjugate observation

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Geomagnetic surveys by Geospatial Information Authority of Japan and contribution of Kakioka Magnetic Observatory

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The Geospatial Information Authority of Japan (GSI) has been conducting geomagnetic surveys in Japan since 1948 to clarify the geographical distribution of direction, intensity of geomagnetic field and their secular variations. GSI has 3 geodetic observatories, about 100 first order geomagnetic stations, about 850 second order geomagnetic stations, and 11 continuous geomagnetic stations. Recently, we carry out continuous observation at geodetic observatories and continuous geomagnetic stations, and repetitive observation at several first order geomagnetic stations. The second order geomagnetic survey was conducted by 1968. As a result of surveys, "Geomagnetic charts" published every 10 years. Geomagnetic charts for the epoch 2010.0 is adopted the new spatial-temporal model. By the use of this model, we can get geomagnetic charts for arbitrary epoch. Then, we can realize yearly variation of magnetic components in visible. The spatial-temporal model can estimate geographical distribution and secular variations in Japan by making continuous data from repetitive data on first order geomagnetic stations and interpolating scattered stations spatially. This model needs good quality continuous data. In addition to geodetic observatories of GSI, the contribution of Kakioka Magnetic Observatory which has been conducting good quality and stably observations for 100 years is large.

Keywords: Magnetic survey, Magnetic chart, spatial-temporal model, Kakioka Magnetic Observatory

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The monitoring and correction methods of geomagnetic data influenced by artificial disturbances

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Magnetic body such as motor vehicles, are source of artificial disturbance for geomagnetic observation. It is necessary to correct those values influenced by artificial disturbances to get exact values. In this report, We introduce the monitoring and correction methods of artificial disturbance for geomagnetic observation.

In the busy farming season in Kakioka Magnetic Observatory and Memambetsu branch, and all the year round in Kanoya branch, motor vehicles or tractors disturb magnetic fields several times a day. We installed a number of magnetometers on site of each observatory in order to estimate position and intensity of the source of artificial disturbance. Moreover in Kanoya, there is a reference observation site outside the Kanoya. In the case motor vehicle stops around observatory, we assume the source of artificial disturbance is a magnetic dipole, and estimate their position and intensity, and correct the observation values.

In Kanoya, not a dipole source but a direct current had affected observation. In this case, we carried out the absolute observation while this disturbance, we had to calculate the quantity of disturbance at absolute observation point. By using the observation data not only steady observation points but also once monthly total force observation points which set up in a grid pattern, we could estimate the direct currents flowed east side and south side of circumference of a site. We could calculate the position and intensity of those currents, and correct the absolute observation values appropriately.

Keywords: kakioka

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Long-term changes in the conductivity anomaly transfer functions at Japanese Magnetic Observatories (second report)

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Utilization of the 100-year data of Kakioka Magnetic Observatory may open many new fields of geomagnetism researches. Among these, the long-term change of the geomagnetic conductivity anomaly (CA) transfer functions deserves to be analyzed because it may tell us important information about relationship between the geomagnetic change and the crustal activity including earthquakes [Yanagihara, 1972].

The preliminary report about the long-term changes in CA transfer functions at Kakioka and other two geomagnetic observatories operated by Japan Meteorological Agency was presented in the Fall Meeting of SGEPSS. In the report, long-term tendency of decreasing Au at Kakioka obtained in the 1976-1988 data [Fujita, 1990] is still continuing, but the rate of decrease becomes smaller in the period of 1976-2011. In addition, no remarkable changes in CA transfer functions were detected before the 2011 Off the Pacific Coast of Tohoku Earthquake. This fact casts a doubt about the remarkable changes of the CA transfer functions at Kakioka before and after the 1923 Kanto Earthquake [Yanagihara, 1972].

In spite of the negative report about relation between changes in CA transfer functions and occurrence of a large earthquake, it seems theoretically reasonable that crustal changes yield a certain variation in the CA transfer function. Thus, it is important to study how much the CA transfer function changes due to crustal changes. To tackle this problem by using geomagnetic data, we need to discriminate between changes of the CA transfer functions from the magnetospheric and ionospheric currents and from crustal changes by using a multi-point and long-term data. For this purpose, data from Kakioka, Memambetsu and Kanoya are idealized sets of data.

In the report, we will present seasonal variations of CA transfer functions and relation between the CA transfer functions and several factors like amplitude of disturbances. It is our target to obtain the change of the CA transfer functions derived solely from the crustal changes.

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Keywords: long-term variation of CA transfer function, Magnetic Observatory, co-seismic change