

The History and the Present Shape of Kakioka Magnetic Observatory

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Routine Geomagnetic observations in Japan were conducted by the Central Meteorological Observatory (CMO) in Tokyo from 1883 during the 1st International Polar Year (1882-1883). Because of deteriorations of observation conditions, CMO relocated the geomagnetic observatory to Kakioka in Ibaraki prefecture, about 75 km northeast of Tokyo in 1913. Therefore, Kakioka Magnetic Observatory (KMO) has the 100th anniversary of the foundation in January 2013.

Unfortunately all the written records stored at CMO before the Kanto Earthquake of 1923 and the geomagnetic records from January of 1917 to August 1923 were lost by the fire caused by the earthquake. Since the last century KMO has conducted several major and minor developments of magnetic observation instruments.

In 1950, KMO developed a new observation instrument that incorporated a temperature compensation function and achieved a remarkable improvement in variation observation accuracy, which replaced the conventional observation instrument. For absolute observation instruments, KMO developed the A-56 universal magnetometer in 1956.

In 1965, KMO installed the MO-P vector proton magnetometer to drastically enhance the quality of its absolute observation, probably making it world class at the time.

In 1976, the Kakioka automatic standard magnetometer (KASMMER) was installed. KASMMER allowed KMO to provide observation data values with a one-minute resolution. Furthermore highest time resolution data of KMO has been changed into three seconds in 1985 and one-second in 1987.

Today, KMO conducts variation observations with a high-sensitivity tri-axial fluxgate magnetometer, which outputs 0.1 second values. Although the fluxgate magnetometer is equipped with a monitoring device that checks inclination and temperature, the annual temperature variation is kept within 3°C, and the inclination variation is also kept stable. While, magnetic disturbances generated by artificial sources are one of the most serious obstacles to maintain geomagnetic observations at Kakioka. Site of Kakioka is surrounded by residential land and farm, artificial disturbances such as those generated by vehicles, buildings, other magnetic bodies or construction work can affect observations. In order to deal with artificial disturbances, an advanced monitoring system has worked at Kakioka since 2008.

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