

整磁合金による地磁氣變化計の溫度補償について (概報)

久保木忠夫

On the Temperature Compensation of a Magnetic Variometer by means of a Magnetic Shunt Alloy*

by Tadao KUBOKI

ABSTRACT

The temperature compensation of the magnetic-variometer has been investigated from various point of views, which is usually of the order of 10γ — $15\gamma/^\circ\text{C}$.

The writer succeeded in keeping the temperature coefficient as small as $0.0\gamma/^\circ\text{C}$ by means of a magnetic shunt alloy of Fe-Ni-Cr system specially made in the laboratory (Metal Matter) of the Tohoku University. This alloy has many following characters.

1. The magnetic Curie point A_3 is 100° — 150° C.
2. The temperature coefficient of permeability is very large.
3. This is no Curiepoint except A_3 .
4. The characters are not changed by cold work, cooling, heating etc.
5. There is a linear relation between permeability and temperature in interval of 10 — 600°C .

The simple bar magnet is considered to be best fit for the magnetic variometer. In this case, the condition to make the temperature-coefficient to zero is as follows:

$$V = V_0 \frac{Q_1 + Q_2}{N\alpha}$$

Where Q_1 : Temperature coefficient of magnetic moment.

Q_2 : Temperature coefficient of quartz fibers rigidity.

N : Demagnetization factor.

V_0 : Volume of the magnet.

* read at the 5th Meeting of the Society of Terrestrial Magnetism and Electricity (May, 1949).

The full paper will be published in near future.

V : Volume of the shunt alloy.

α : Temperature coefficient of permeability of shunt alloy.

Recently he has also succeeded in making a new portable variometer by using the shunt alloy mentioned above. It can be used in feild where the change of temperature is $10^{\circ}\sim 20^{\circ}\text{C}$, and its stability is very high (accuracy is about 0.5%).