

Analyzing the early 19th century's geomagnetic declination in Japan from Tadataka Inoh's Santou-Houi-Ki The 4th report.

Motohiro Tsujimoto^{1*}, Akitoshi Omotani²

¹Japan Cartographers Association, ²San-in System Consultant Co.Ltd

Santou-Houi-Ki Japan's important cultural property is the survey data book comprised of 67 volumes consisting nearly whole of Japan's mainland survey by magnetic compass azimuth of approximately 200,000 datas in 1800 to 1816, written by cartographer Tadataka Inoh. If we analyze the data of Santou-Houi-Ki, we can make a isogonic map farther more accurate and more detailed than Gauss-Weber's isogonic Atlas in 1830 for the Japanese Islands.

(1) Advantages to use the data recorded in Santou-Houi-Ki.

1. Huge number of survey data. 2. The value of declination is vary less than 30 min in each of east and west from the average. 3. Datas are concentrated in 1800 to 1816. 4. Datas cover nearly whole of Japan's mainland.

(2) Method of analysis. 1. collation with the written contents of Inoh's survey diary, Inoh map, old maps, source books of local history to confirm the position of the reference point. 2. Reproduce the spectacle in the locale by using the spectacle reproduction software and confirm the content of the spectacle. 3. Consult with the specialist in local museum or go for inquiries around the neighborhood. 4. Read the latitude and longitude of the reference point from the map in the homepage of the Geological Survey institute. 5. Carrying GPS navigater and if the reference point can be surveyed, it does and measure the local latitude and longitude. 6. Search the true azimuth substitute the longitude and latitude of both reference point and target point to the calculation formula of true azimuth. 7. Calculate the average of the remainder as the declination, deduct the magnetic azimuth recorded in Santou-Houi-Ki from the true azimuth. 8. Software that automated the fourth the above mentioned calculations was made by Mr. Omotani San-in System Consultant Co.ltd.

(3) The distribution of the geomagnetic declination in western Japan and today's research subject. 1. Our subject in today is to analyze the unanalytical part between Matsue 1 degW in 1806, and Tanegashima 1 deg W in 1812, or Northwestern Tsushima 2deg 30min W in 1813 and Tanegashima 1 deg W in 1812.

A lots of stratum of the volcanic systems are in Kyushu area.

We avoid and analyze the the points in the stratum of the volcanic systems that drove the magnetic needle mad.

(4) Use in History geography field.

Detailed positions such as the historic site, shrine, temples, and gigantic trees recorded in Santou-Houi-Ki turn out at the same time as analyzing the geomagnetic declination from Santou-Houi-Ki. This Analytical result becomes measurement material at the age of ruins with the residual magnetized things.