

SEM036-P13

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## Analyzing the early 19th century's geomagnetic declination in Japan from Tadataka Inoh's Santou-Houi-Ki The 5th report

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Santou-Houi-Ki, a national treasure of Japan recorded by Tadataka Inoh is 67 volumes data book consisting of approximately 200,000 magnetic compass azimuth data in 1800 to 1816. The recorded points cover almost of mainland Japan. In 1918 the declination of only one point at Inoh's retirement home Fukagawa in Edo(Tokyo) was analyzed, but nobody analyzed the other data.

We've started the analysis of them.

(1)The analysis of the data in Santou-Houi-Ki supplies new data to the northeast Asia and mainland Japan in early 19th century in particular. It makes mainland Japan as one of the area having a lot of accurate data of geomagnetic declination in the World. Currently the number of analyzed points is more than 100, and the outline of the distribution of declination in mainland Japan in early 19th century became clear gradually.

(2)The comparison of Santou-Houi-Ki with Gauss and Weber's isogonic Atlas published in 1840, consisted of the observational data in 1830(1828-1832 exactly), its foundational structure of Gauss's isogonic lines in Japan is almost similar to the result of analysis from Santou-Houi-Ki. But we can see the contradiction to reverse with secular variation in northern Kyushuu area and Tsushima Island or the local differences in eastern Hokkaido in Gauss's Isogonic Atlas. The observational data in Japan archipelago did not described in the table of the observational data in the supplement of Gauss's isogonic Atlas. Therefore the supplementation by the result of analysis from Santou-Houi-Ki became very important. To grasp the variation of geomagnetic declination, we concentrated on analysis in western Japan, where easy to grasp the variation of declination because the geographical feature is long from east to west.

(3)Advantages to use the data described in Santou-Houi-Ki. 1.Huge number of survey data. 2.Minute standard of analysis. 3.Data are concentrated in 1800 to 1816. 4.Data cover almost mainland of Japan.

(4)The development and improvement in analysis method. 1.Calculate the average of remainder as the declination, to deduct the magnetic azimuth recorded in Santou-Houi-Ki from the true azimuth. 2.The important point in deciding the precise position of the reference point should be adjusted so that all of the declination values calculated from azimuth to different target at the reference point are approximately equal to each other. 3.Use GPS transmitter at the reference point for investigation of longitude and latitude. 4.By the request from Motohiro Tsujimoto to make a consecutive formula by use Excel for speed up his process in the above, Akitoshi Omotani realize this important improvement.

(5)Trial to popularize the knowledge of restoring the local geomagnetic declination and the precise position of reference point from Santou-Houi-Ki was started. In Shimane and Totori prefecture, it's inserted in the newspaper San-In Chuou Shinpou's column and the bibliography of local history edited by Takaaki Inui obtain good response. Their lecture held by Takaaki Inui and Akitoshi Omotani at local lecture class giving very strong impression to the audience.

Keywords: geomagnetic declination, Tadataka Inoh, Santou-Houi-Ki, Isogonic Atlas by Gauss and Weber, secular variation of geomagnetic declination, restoring the precise position of survey's reference point