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Analyzing the early 19th century's geomagnetic declination in Japan from Tadataka Inoh's Santou-Houi-Ki The 7th report

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Santou-Houi-Ki Japan national treasure is the survey data book comprised of 67 volumes consist of magnetic compass azimuth of approximately 200,000 data in 1800 to 1816, cover nearly whole of Japanese mainland cartographic survey, written by cartographer Tadataka Inoh. We continue the work of analysis that stopped after only analysis in 1917, which done about the survey data at Inoh retirement home Fukagawa in Edo (Tokyo) in 1802-1803.

(1)If we analyze the data of Santou-Houi-Ki, we can change Japan as one of the most concentrated area of accurate geomagnetic declination data in the world, back to early 19th century, from insufficient area of data, and supply new data to northeast Asia. The total Number of analyzed points is exceeded by 175, and the outline of the distribution of declination in Japan archipelago and the rough distribution of the declination in every15 minutes in western Japan coast in early 19th century, begun to appear.

(2)Comparison of Santou-Houi-Ki with Gauss and Weber isogonic Atlas which published in 1840, consisted of observational data roughly at the time of 1830(1828-1832), it foundational structure of isogonic lines in Japan archipelago is roughly similar to the result of analysis from Santou-Houi-Ki, But we can recognize the contradiction to reverse with secular variation in Northern Kyushuu area and Tsushima Island, or the local differences in eastern Hokkaido in Gauss and Weber isogonic Atlas, The observational data in Japan archipelago did not described in the table supplemented with Gauss isogonic Atlas. The described observational data in East Asia were from Pekin. Monggol, Baykal, Yakutsk Ohotsk Kamchatka etc. The isogonic line of declination in surrounding area of Japan in Gauss and weber's Atlas had to drawn by calculated estimates. The Gauss and Weber's Atlas was draw to understand the general conditions of geomagnetism of the entire world. The declination data in the table were calculated on a matrix of 5 degree of latitude and 10 degree of longitude, one cell of this matrix is 500km long. Therefore the analysis of Santou-Houi-Ki becomes very important as complement data.

(3)Advantage to use the data described in Santu-Houi-Ki.1.Huge number of survey data. 2. Minute standard of analysis. 3. The Data are concentrated in 1800 to 1816. 4. Data cover nearly whole of Japan Mainland. 5. It include the ability of local abnormality, if there is a remarkable differences between Gauss Atlas and the value of analysis from Santou-Houi-Ki. 6. We can restore the precise position of Tadataka Ino reference point in less than second unit in latitude and longitude from Santou-Houi-Ki.

(4)Analysis method of Santou-Houi-Ki needs the succession to future. 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 to that all of the declination values are calculated from the 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. Consecutive formula use Excel for speed up and keep accuracy. 5.The result of analysis is useful for global model of geomagnetisism.6.It is available for the analysis of magnetic survey azimuth data in the world. 7.Restorated precise position of the survey reference points contribute to detail study of history. Keywords; 1. geomagnetic declination 2. Tadataka Inoh 3. Santou-Houi-Ki 4. Isogonic Atlas by Gauss and Weber 5. Secular variation of geomagnetic declination 6.Restoration of precise position of survey point

Keywords: geomagnetic declination, Tadataka Inoh, Santou-Houi-Ki, Isogonic Atlas by Gauss and Weber, Secular variation of geomagnetic declination, Resoration of precise position of survey point