Analyzing the early 19th century’s geomagnetic declination in Japan from Tadataka Inoh’s Santou-Houi-Ki The 12th report

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The Santou-Houi-Ki is a national treasure of Japan 67 volumes of magnetic compass survey ledger recorded by cartographer Tadataka Inoh in 1800 to 1816, consist of approximately 200,000 magnetic compass land survey azimuth data accuracy of 0 degree 5 minute, from southern coast of eastern Hokkaido to Yakushima island in western Japan.

I restarted the analysis in 1999, by interdisciplinary simultaneous analysis across geomagnetism, land survey science, historical cartography and local history, after stopped only one analysis in 1917 by Professor Ryoukichi Ohtani Kyoto University, done about the magnetic compass survey azimuth data at known position of the retirement home Tadataka Inoh at Fukagawa in Edo (Tokyo) in 1802-1803. (1) Interdisciplinary simultaneous analysis: We can increase precise evidence to verify the real azimuth, geomagnetic declination and the reference point where magnetic compass survey was executed, or survey target points recorded Santou-Houi-Ki, than traditional way of study separated in each field. (2) Procedure of analysis: Use the recreation software of scenery and digital map of GSI Japan Chiriin Chizu to know the latitude and longitude accuracy sec of particular survey targets, and the outline position of survey reference point to grasp the outline of each real azimuth from the survey reference point to survey target points. Geomagnetic declination = Real azimuth - Magnetic compass survey azimuth recorded in Santou-Houi-Ki. Calculate backward the precise position of the survey reference point should be adjusted to the position in accuracy 0.001 sec, in latitude and longitude, where all of geomagnetic declination unit of 0.001 sec. Calculate from the magnetic compass survey azimuth to each different survey target points at the reference point are approximately equal to each other. Calculate the average value of each declination unit of 0.001 sec, and express it as the geomagnetic unit of 1 min, on the day and the reference point Tadataka Inoh’s magnetic compass survey was executed. To develop consecutive formula of Excell for speed up and keep accuracy. If it is possible to go to the field of the survey reference point, confirm the real scenery and the longitude and latitude by GPS transmitter and re-calculate the value of geomagnetic declination. (3) The outline of isogonic line in Japanese archipelago and the distribution of the declination in every 15 min in western Japan coast in those days are begin to appear. Compare the isogonic line of declination in those year's Japanese archipelago by analysis of Santou-Houi-Ki, with the Historical declination viewer by NOAA (1800, 1805, 1810, 1815) is the NOAA's pace of variation West is almost 5 years later than the analysis from Santou-Houi-Ki in western Japan. (4) However, from the analysis of Santou-Houi-Ki, we can recognize the magnetic declination supposed as the local geomagnetic declination anomaly in southern coast of eastern Hokkaido, some part of Noto Peninsula, Mt Asama in Ise, Nobeoka city in Kyushu, etc. and revealed in the long western coast of Tsushima island etc., it impossible to drew in historical declination viewer by NOAA. The analysis is developed from the coast area of Japanese archipelago to the inland area of Honshuu island. (5) It is able to restore the precise position of survey reference points where Tadataka Inoh's magnetic compass survey was executed the accuracy of less than sec in latitude and longitude, valuable in local history. It is so accurate as impossible to achieve by other way of study. (6) It is able to change Japan as the concentrated area of data in early 19th Century from insufficient area of data and supply data to northeast Asia. Total number of analyzed points exceeded 207. (7) We started the discussion to compile those analysis to the data base available to Japan Archeo-magnetism Data Base, or NOAA's Historical Declination.
Viewer.

Keywords: geomagnetic declination, Tadataka Inoh, national treasure "Santou-Hou-Ki", survey reference point, survey target point, interdisciplinary simultaneous analysis of literature and science