Analyzing the early 19th century's Geomagnetic Declination in Japan from Tadataka Inohs' Santoh Hoh-i-ki.

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The first analysis of geomagnetic declination of Japan in the early 19th century was made by Dr. Ryokichi Ohtani in 1917. Based on 'Santoh Hoh-i-ki', the gigantic survey data book of magnetic direction from 1800 to 1815,comprised of 67 volumes (Japan's Important Cultural Property), which was written by Tadataka Inoh, a famous Japanese cartographer in the Edo era. Dr. Ohtani analyzed the average geomagnetic declination in Edo (Tokyo) during the period of 1802 to 1803 as 0 deg. 19 min. E. He concluded that the early 19th century's geomagnetic declination in the whole of Japan was more or less than 0 deg. EW mark. Dr. Ohtani wrote that the analysis was not an easy work and left it as a future assignment for others.

In today's map of the Republic of Korea, we cannot find the name of nine mountains in Korea which were drawn in the map of Japan by Tadataka Inoh. In order to identify those mountains on the two maps, I have recreated of the magnetic direction in Tsushima Is. on the Korean mountains from the angle noted in 'Santoh Hoh-i-ki' and found the declination to be 2 deg. 30 min.in W.in 1813. Furthermore, by the same method, I confirmed the average declination between the recreated magnetic direction lines and the real meridian azimuth from Tanegashima Is to be 1 deg. W in 1812. Analysis was restarted after 84 years from Dr. Ohtani's. I have also found that the average declination in Osaka 1805 was 0 deg. 47 min. W, in Edo (Tokyo) 1802 was 0 deg. 26 min. E in 1803 , 0 deg. 14 min. E. Moreover I started the analysis of the whole of Japan from Hokkaido Is. and North Eastern area in Honshuu Is. by following steps. Choosing the starting points of my survey where Inoh reportedly made his survey such as his lodge, cape, lighthouse, temple, shrine, observation post, etc. with cooperation of the local educational committees in order to maintain accuracy. Measuring of latitude and longitude in the field by portable GPS equipment. Confirmation of latitude and longitude including starting points and surveying objects, referring to digital maps and the description of 'triangulation point' in the homepage of National Geographical Survey Institute. Identification of the survey points and objects and the top of the mountains by those appearances etc. using photographs and digital scenery recreation software.

Calculation of the remainder of the magnetic direction and azimuth applying the calculation formula between 2 points shown in the homepage of National Geographical Survey Institute. Disposing the mistaken data and calculation of the average geomagnetic declination at every starting point. As a result, almost all of the geomagnetic declinations in Hokkaido Is .in 1800 veer east and we can confirm a remarkable change between western and eastern parts of Hokkaido. The magnetic declinations at Matsumae, southwest end of Woshima Peninshula show 0 deg. 30 min. W, and at Uchiura Bay it changes to 0 deg. E mark. Going further to the east along the sea coast, we see the magnetic declinations veer east. At Rebunke it shows 1 deg. 30 min. E; and at Hiro-o ,east to Erimo cape ,it shows 3 deg. 30 min. E. At Kushiro in eastern Hokkaido it shows 3 deg., and at Mt Barasan Akkeshi 2 deg. 30 min. E. Through my analysis, I found the isogonal line 0 deg. EW in North Eastern Honshuu Is. during 1801 to 1802 starting from Tsugaru Peninsula and moving from Kinkouji Akita Prefecture to Yuzawa, the western foot of Ou-u mountains range, and further to Yonezawa, Yamagata Prefecture down south along the Japanese archipelago. And in 1803,in the Hokuriku Area passing Teradomari, Nagaoka city, Niigata prefecture.

The improvement of the analyzing method and system will bring us more magnetic declination data.