

Japanese Map Warper for Spatial Humanities: The Japanese old maps portal site

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Abstract:

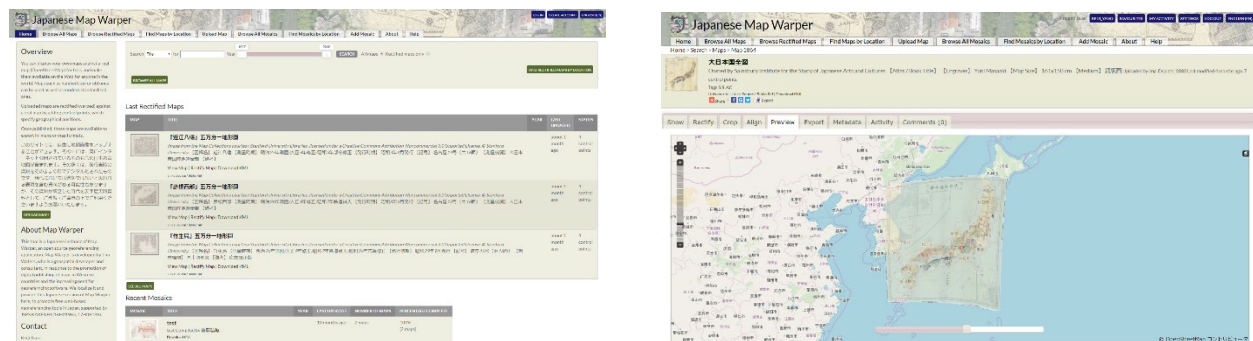
Since the middle of the 2000s, digital humanities (DH) involving the collaboration and uniting of research fields from both the humanities and sciences has begun developing rapidly. It involves investigation, analysis, synthesis and presentation of knowledge through the use of Information and Communication Technology (ICT). It is expected to create a new knowledge base within the humanities; history, linguistics, literature, art, files, and so on. By definition, a new field of digital humanities is technical driven given its elaborate use of computing, and is also distinctly interdisciplinary through the ICT (Kawashima et al., 2009). At the same time, “spatial turns” are referred to throughout the academic disciplines, often with reference to GIS and the neogeography revolution that puts mapping (Guldi, 2018).

As human geography would be a part of the humanities, so all research within human geography can be a part of digital humanities. Geo-spatial information that is dealt with in geography possesses geo-referenced data. GIS has also become popular in digital humanities. The application of GIS within history is facilitating the formation of a new area of research, historical GIS (Gregory and Healy, 2007). Historical geographers have been making use of GIS as a research tool, applying it to historical space within a geographical context. However now we see historians beginning to use GIS within their own research. So far, the relation between human geography and history has been compared to the difference between the dimensions of space and time. While geographers make extensive use of maps focusing on spatial patterns of their temporal changes (spatial process), historians make use of ancient documents as a resource focusing on the temporal relationship between phenomena (Knowles, 2008).

To ensure a leaping development in the new project-based research style through interdisciplinary and international collaboration within Historical GIS in Japan, and by extension traditional humanities in Japan, it is of great urgency to build portal sites that can provide comprehensive and lateral search of Japanese old maps which are fundamental materials, while making GIS analysis possible.

The aim of this paper is to introduce Japanese Map Warper (bilingual version), based on an online georeferenced tool developed by Mr Tim Waters in 2009, and to construct a portal site of Japanese old maps which can be embedded into GIS.

First, we have developed Japanese Map Warper on our server (Figure 1). Whilst it is an open source application, it relies upon map images being uploaded to a server from which their owners had no ongoing control or rights over them. The functions of Japanese Map Warper include, 1) uploading image files (JPEG, PNG and TIFF formats), 2) browsing the maps with metadata, 3) searching the maps from their metadata as well as their location, 4) georeferencing like the georeference tools in ArcGIS and QGIS, and 5) exporting georeferenced maps to KML, GeoTIFF and WMS formats.



1) Top page

2) Rectify (georeference)

Figure 1. Japanese Map Warper. (<https://mapwarper.h-gis.jp/>)

Second, we have put the images and meta data of Japanese old maps into this system, which have been published from the websites of their map owners. At the moment, we have gathered digital images of Japanese old maps exported overseas from the following websites in collaboration with each of libraries and institutes;

- 1) Branner Earth Sciences Library, Stanford University Library (<http://library.stanford.edu/guides/gaihozu-japanese-imperial-maps>)

Stanford University Libraries hold a large collection of *gaihozu*, Japanese military and imperial maps. These maps were produced starting in the early Meiji (1868-1912) era and the end of World War II by the Land Survey Department of the General Staff Headquarters, the former Japanese Army (Stanford, 2017). Over six thousand *gaihozu* cover a broad area including Japan, China, Mongolia, North Korea, South Korea, the Philippines, and beyond. Through the ArcGIS online interface we can search for maps geographically and then download the images at multiple resolutions by IIF. However the metadata provided by the Library has not included, map name, year of publication and so on.

- 2) C. V. Star East Asian Library, University of California, Berkeley (<http://www.davidrumsey.com/japan/>)

The C. V. Star East Asian Library, UCB, holds about 1,800 Japanese old maps, the Japanese Historical Map Collection which was acquired by the University of California from the Mitsui family in 1949. These maps are scanned and put online by Mr David Rumsey and Cartography Associates (UCB, 2005).

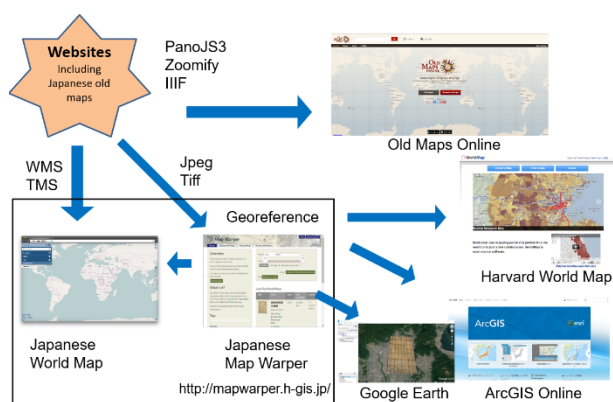
- 3) British Library

The British Library collection of maps has 4.5 million maps (British Library, 2019). Though the Library holds about 400 Japanese old maps, Kornicki (2011) made the catalogue of them. Theses collection includes Japanese maps of part of the collection of Japanese books and maps formerly belonging to Engelbert Kaempfer (1651-1716) and the collection of the pioneer japanologist Philipp Franz Balthasar von Siebold (1796-1866), and were purchased from his son, Alexander von Siebold (1846-1911). Now these maps are scanned by the in-house digitalization team in British Library.

- 4) Sainsbury Institute for the Study of Japanese Arts and Cultures (SISJAC) (<http://sainsbury-institute.org/library/cortazzi-maps/>)

The SISJAC has about 70 maps of Japan from the Cortazzi Collection. Almost two thirds are maps produced in Europe dated from 1522 to middle of the 19th century. Others are of Japanese origin mostly from mid to the late Edo period (1603-1867), and some are from the Meiji era (1868-1912) (SISJAC,2019). These are important resource and archival materials for scholars and students interested in not only cartography, but also in other disciplines including history, politics and art. These maps were scanned and published by the Art Research Center, Ritsumeikan University.

Next, we have retrieved the map images and metadata which they already published through the above webs. Now you can view approximately three thousand Japanese old maps at our Japanese Map Warper. As to Stanford's *gaihozu* covering Japan islands; 1,111 old topographic maps (1:50,000) and *Teikokuzu* (1:200,000), we carried out georeferencing of about 1,200 old topographic map images which cover entire Japan islands through the Japanese Map Warper, and added the metadata of their names, issued years, surveyed years, and geographic coordinates of four corners as control points. These georeferenced old topographic maps are exported other WebGIS using WMS; Hinata GIS (<https://hgis.pref.miyazaki.lg.jp/hinata/>) and ArcGIS Online, as Figure 2.



Now we are constructing Japanese World Map developed by the Center for Geographic Analysis at Harvard. When Japanese World Map and Japanese Map Warper are combined, it would make true GIS analysis possible for Japanese old maps.

In conclusion, we would like to promote spatial humanities and historical GIS using these portal websites. In order to collect the information about Japanese old map collections and digitalize them, we pursue to collaborate with libraries, museums and local governments in and outside of Japan. Such interdisciplinary and international collaboration would be the very driving force for revolutionizing conventional humanities.

Figure 2. Japanese Map Warper.