

High Resolution Archive of Old Maps Tokushima University Library

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Tokushima University Library

- FY1997- : Data digitization and archiving of old maps/pictorial diagrams started.
- As a part of the development of digital library system

Tokushima University Library's concept for digitization

- Digital data that allows the accurate reproduction and decipherment of original materials
- Generation of high-definition image data on old maps/pictorial diagrams suitable for research purposes



1999 - High definition digital archives of old map/pictorial diagram collections from the early-modern period

<http://www.lib.tokushima-u.ac.jp/~archive/>

2015 - Inoh Maps Learning System

<http://www.lib.tokushima-u.ac.jp/~archive/inohzu/>

Old Map/Pictorial Diagram Collections from the Early Modern Period held at Tokushima University Library

Approx. 200 items including mainly antique maps and pictorial diagrams owned by the former domain lords of Tokushima

[Tokushima] 55 items : **Awa/Awaji-no-kuniezu** (Province maps of Awa and Awaji (maximum size: 4.5m x 5m), 5 maps; Mura-ezu (map of a villages); etc.

[Japan] 20 items : **Inoh-zu** (Survey Japan map first created in Japan), 10 maps; Kanban-jissoku-nihonchizu (survey map of Japan, official edition), 4 maps; etc.

[Provinces] 49 items : Various domain maps including manuscripts and reproductions; etc.

[Edo (the former Tokyo)] 44 items : various printed map of Edo castle town; etc.

[Kyoto:] 16 items : Kyo-oezu (map of Kyoto); etc.

[World] 17 items : Chikyu-zu (global map); Konnyo-bankoku-zenzu (world map); etc.



Awanokuni-oezu (Genroku-kuniezu)
(4.25m in height, 5.04m in width)

Too large to spread out;
unable to photograph

Valuable Inoh Maps:
letters are too tiny to read
with the naked eyes.



Inoh-zu/Dainihonenkaizuko (Nankai)
(1.140m in height, 1.515m in width)

Efforts to build Digital Archives at Tokushima University Library

- 1993- Started basic research on old maps/pictorial diagrams held at the library (Hirai Laboratory)
- 1997- **Generated high resolution image data of 6 large pictorial diagrams**, using the FY1997 Tokushima University Special Budget for Educational Research. (Data capacity per item: approximately 300 MB) → **the capacity of computer/imaging analyzing software at the time.**
- 1998- **Started in-library use of high-resolution maps** through Gigaview/**Created high definition image data of total 44 old maps**/pictorial diagrams by using FY1998 & 1999 KAKENHI, Grant-in-Aid for Publication of Scientific Research Results (on database) (Capacity per old map/diagram: approximately 2GB at a maximum) → **DVD and external hard disk drives at the time were not fully developed (image data was saved in a computer's hard disk.)**
- 1999- **Posted “High Definition Digital Archive of Rare Materials,” a portal site for old maps, on the library website.** High definition image data and bibliographic information **made available online** via MADO, a high-speed browser
- 2004- Started the distribution of large-capacity data via a high-definition image viewer (ZOOMA). Seamless zooming up and down of the image data available on the web.
- 2015- **Started the publication of 4 high definition Inoh Maps** created at 800 dpi (approximately 10GB per item) on **the Inoh Maps Learning System** in the Tokushima University Library website. This project was funded by the FY2014 Grants of the Library Advancement Foundation, Japan.

<http://www.lib.tokushima-u.ac.jp/~archive/>



Top page of the first version archive



Top page of the second version archive



Top page of the current archive

※画像をクリックすると高精細な画像が見られます。

整理番号	図名	縦(mm)	横(mm)	阿波国文庫印	不忍文庫印	体裁	和暦	西暦	様式	彩色	刷色	高解像度
徳1	阿波国大輪図	2272	1750	×	×	8	(慶長10頃)	1609	手書	彩色	※	◎

料紙種類	数量・形態	分間(縮尺)	表装・箱情報	保存状態
楮・雁皮系	1 鋪・折り畳み	約3寸1里(約43,200分の1)	ナシ	北西辺の一部が欠損、裏打ちあり

画像

元データの容量 24,793px × 19,173px
(幅×高さ) 1.32GB

備考

文部科学省国文学研究資料館史料館の「阿波淡路両国輪図(阿波国)」(鎌須賀家文書1197-4)と輪図仕立てや記載内容が同じ。

解説

作成年は不詳であるが、(1)寛文4年(1664)に阿波国10郡に再編される以前の13郡が示されている、(2)徳島城下の福島地区がまだ「地き速」と表現され、船屋の置かれた安宅が現在の常三島地区に位置している、(3)阿波九城のうち、「撫養」「わき」「大西(池田)」「一宮」「富岡」「わしき」「とも」の7城が、ほかの村名を表記した小判型の村形と異なる丸型で表現されている、(4)「里の海士」「かなまる」などの中世荘園名の名残がみられる、(5)海岸線や国境の形状が推定などの点から、近世初期の慶長国輪図ではないかと推定される。

Preparation started in 1993 based on the baseline examination.
(Hirai 2001) ⑦ requires update

Bibliographic information

- Call number
- Title
- Size
- Year of production
- Writing paper
- Volume/form
- State of preservation, etc.
- Image
 - High definition
 - Number of pixels & Capacity
 - Photograph
- Note
- Explanation
- Reference

Image Data of the High Definition Digital Archive



“Nankai” from the Inoh Maps

- 114cm in height and 151.5cm in width
- Minimum letter size: Kanji 3-5mm; Katakana 1-2mm
- 8x10 film Photographed in 9 separate parts
- High definition image data (created in 1997)

TIFF: 1.84GB; equivalent to 400 dpi
Seamless images available on the web

Overcame challenges for historical map studies

- Limited access to rare materials/large pictorial diagrams
- Illegible letters in catalogs and minified reproductions
- Deterioration of the materials caused by using or studying them

Digitization of high definition image

Respond to two conflicted requests for the material, “using” and “preserving

Advances of the computer and GIS software performance, in addition to the development of high definition image data, have facilitated the utilization of old map data and GIS research on old

GIS Analysis of Old Maps using High Definition Image Data

Old maps/pictorial diagrams

Absence of space attributes (latitude/longitude location, elevation data) and map projection

Digitization of image data

Capture and analyze old map image data using GIS software

GIS : Geographic Information System

Digital mapping systems connecting database and digitized maps

Utilize geo-referencing functions of a GIS software (e.g., AcrGIS)

Convert old map image data to data with space attributes (location data)

Sumoto-gosange-gazu
(map of Sumoto Castle town)

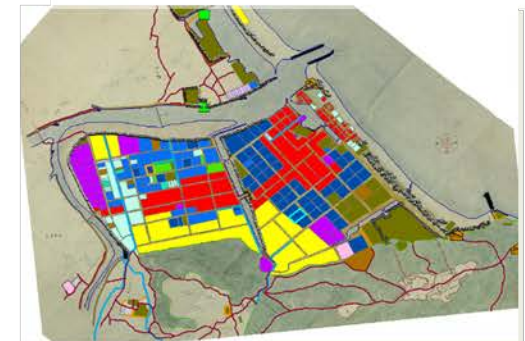


Samurai
warrior's
residence

Blue: Samurai warrior's residence
Yellow: Daimyo's residence
Red: Townhouse
Purple: Shrines and temples



Location adjusted using a
GIS software



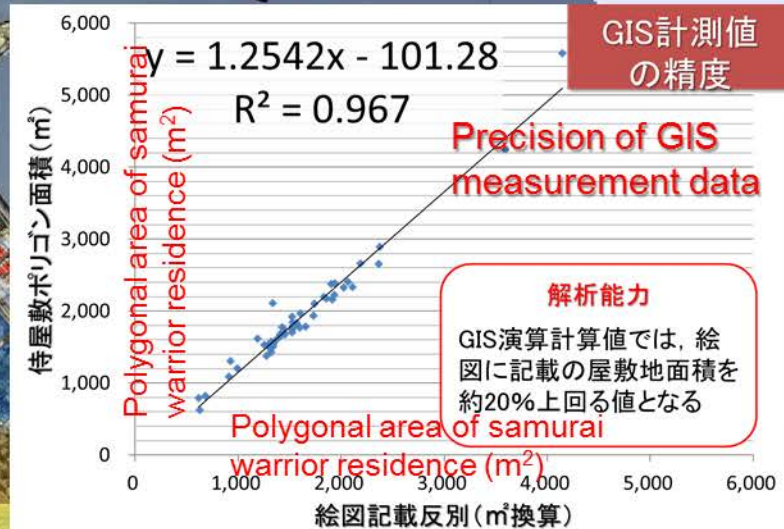
GIS mapping of the
information provided on
the old map

Circa 1870
1,454mm in height X 1,935mm in width,
Scale size: approx. 1/1200, Image data: 871MB

Structural Changes in the Former Castle Town of Sumoto



T48_内町外町・土地利用	水軍屋敷
土地利用2	下屋敷・船置場
藩施設	明屋敷他
高取屋敷	稲田家臣屋敷
卒屋敷	寺社
無足屋敷	町屋
足輕組屋敷	百姓・建家
	不明

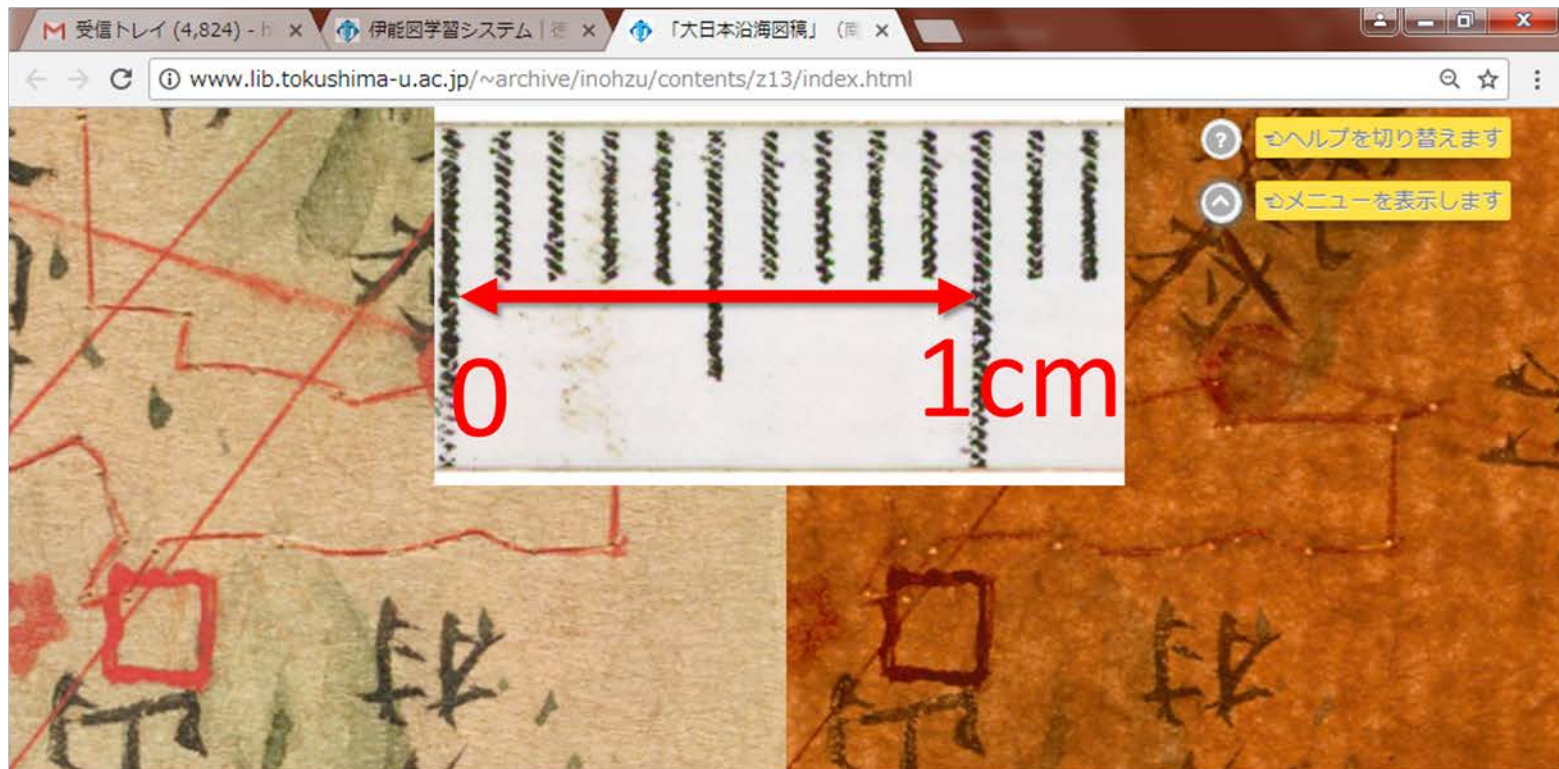


- An overlay of Sumotogozangegazu (Pictorial diagram No.15) with position information adjusted, and an aerial photograph of the town containing longitude and latitude information. (Layers superimposed)

- GIS analysis using the high definition image data → a new approach for old map & pictorial diagram studies

Inoh Maps Learning System Launched in 2015

<http://www.lib.tokushima-u.ac.jp/~archive/inohzu/>



“Nankai” from the Inoh Maps

- Photographed separately with a high resolution scanner. Backlight photographing
- Super-high resolution image data (created in 2015)

TIFF 8.27GB (8266MB) Equivalent to 800 dpi

Created data for the following 4 items out of 10 Inoh Maps

- Call No. Zen 6-1 Enkaichizu
- Call No. Zen 13 Dainihonenkaizukou Nankai
- Call No. Zen 14 Dainihonenkaizukou Saikai
- Call No. Sho. 45-3 Buzennokuni-enkaichizu 3



Analysis of the Pinholes on the Inoh Maps

- Roads: 7,606 holes
- Other: 210 holes
 - Latitude (latitude lines)
 - compass rose
 - label of location
 - summit area (line of sight)

High resolution digital data has enabled new methods of analyzing the Inoh Maps

- Precision of the Inoh Maps = analysis of survey precision
- Clarification of its production method
- Clarification of its developing process

The weakest research areas among studies on the Inoh Maps.

Akihiro Tsukamoto

Associate Professor, Tokushima University
Analyzed as a point data on ArcGIS

Challenges for High Resolution Image Data/ References

Challenge:

- High cost for image data production limits the number of maps to digitize.
- Increment of data capacity
- Data utilization at recipient institutions; various publication methods
- Ownership right/copy right of image data, etc.

Expectation

- Provision of old map/pictorial diagram information
- New approaches for analyzing old maps/pictorial diagrams
- Contribution to a local society
- Link to various map information, database, and websites

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