

The Construction of the Digital Gazetteer and the Topographical Maps Database based on Humanities GIS

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Purpose of the Digital Gazetteer

- ◆ Due to the rapidly increasing availability of geographic information systems (GIS) in recent years
- ◆ Social Science Fields : Archaeology, Anthropology, History and Area Studies
 - *Tools that coordinate digitized maps and other geographic information are providing effective support for joint research.
- ◆ Internationally the use of spatiotemporal data in social science research is on the increase
- ◆ In Japan, there are currently almost no tools such as digital gazetteers that can form an effective research infrastructure for such research.
↓
- ◆ We created a digital gazetteer of historical place names and converted it into an effective database, and also jointly developed an interface for HuMAP(geographic information sharing system for humanities).

Characteristics of the Digital Gazetteer

- ◆ *Dainihon Chimeijisho (The Dictionary of Place Names in Greater Japan)*
- ◆ Edited by Togo Yoshida (1864-1918)
- ◆ In 1895, Yoshida decided to compile the Dictionary of Place Names since there were no standard dictionaries for place names in Japan.
 - The first edition was published in 1900
 - Completed in 1907, spending 13 years on compiling
- ◆ The first full scale, real dictionary of place names in Japan.
- ◆ Still used as a basic source in historical geography more than 100 years after it was published

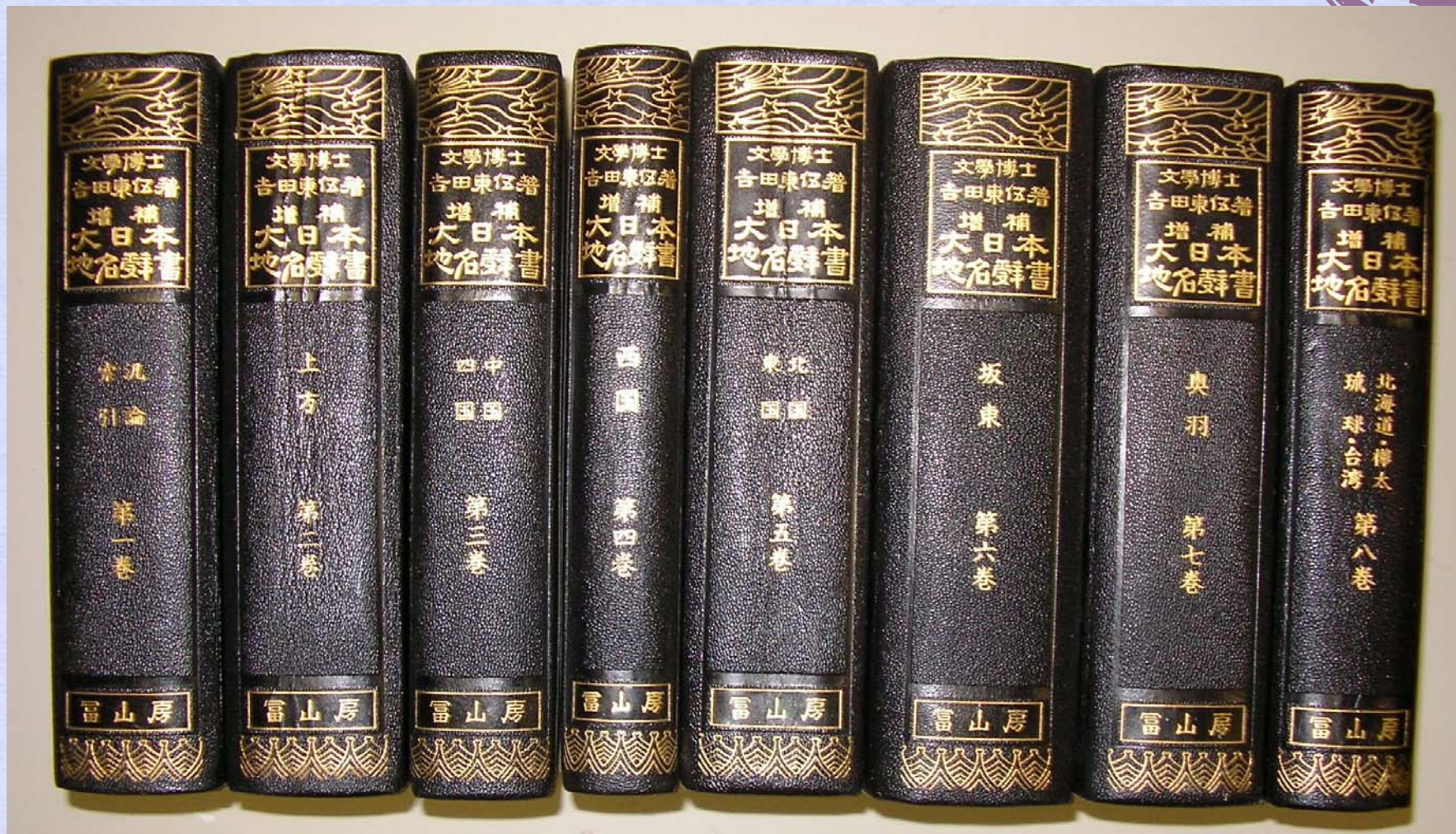


Figure 1. Sample bound volume of Fuzambo publication of *Dainihon Chimei Jisho*, Volumes 1 through 8

増補
大日本地解書

文学博士

吉田東伍著

上方

富山房

Title of Dainihon Chimeijisho

ア

相川(駿河)	相川(甲斐)	相川(佐渡)	相川(越後)	合川(羽前)	相神浦川(肥前)	相神(能登)	秋鹿郡(出雲)	合海(羽前)	合貝(羽前)	遇鹿(常陸)	秋鹿(出雲)	相賀(常陸)	相河(越後)	相合(安芸)	相生橋(羽前)	秋穂(周防)	阿井(出雲)	藍(摂津)
アイカワ	アイカワ	アイカワ	アイカワ	アイカワ	アイカミウラ	アイカミ	アイカ	アイカイ	アイカイ	アイカ	アイカ	アイカ	アイカ	アイカウ	アイカウ	アイカウ	アイ	アイ
5・九五三	5・八四〇	5・三八三	5・三五九	7・七六五	4・三〇八	5・一二三	3・三七三	7・七六四	7・七六五	6・二二五一	3・三七五	6・一二五二	5・三五九	3・四八〇	7・六九〇	3・五六三	3・四〇〇	2・六二一

相坂(陸奥)	愛甲郡(相摸)	愛甲熊野社(相摸)	阿位郷(出雲)	安威郷(摂津)	愛甲(相摸)	相子(肥前)	合蚕(肥前)	阿育王塔(近江)	相木(信濃)	合川山(美濃)	相川鉦山(佐渡)	藍川郷(美濃)	安威川(摂津)	鮎川(上野)	鮎川(羽後)	鮎川(近江)	相川(美濃)	相川(羽後)	相川(羽後)
アイサカ	アイコウ	アイコウ	アイ	アイ	アイコウ	アイコ	アイコ	アイクオウ	アイキ	アイカワ	アイカワ	アイカワ	アイ	アイカワ	アイカワ	アイカワ	アイカワ	アイカワ	アイカワ
7・一〇一七	6・五七	6・五八	3・四〇〇	2・五七三	6・五八	4・三三五	4・三三五	2・六九九	5・八〇四	5・四〇一	5・三八三	5・四〇五	2・五七三	6・七四二	7・八八二	2・六八〇	5・四〇三	7・九五〇	7・八八二

Figure 2. Example from the index of Volume 1 of the *Dainihon Chimei Jisho*

大和国

大和国

ヤマト
オホヤマト

大和は大和川の上游に在りて一國を成す。

四周山を以て囲み平曠肥腴なり、神武天皇
檀原カシハラ奠都の後列聖の宮室歴代遷移ありと雖大略此間を
出でず、和銅中平城京ナラノミヤコを造営せられ規制最大なり、延
曆中山城に遷都あり猶南都ナントと称しき。此国南方は豊嶂
属嶺綿亘太広し、吉野郡ヨシノと云ひ本国に隸し其水脈を相
すれば吉野北山キタヤマトツ十津の三水の上游にして、一水は横流
し(吉野)二水は縦貫す。又東方宇陀郡ウダは伊賀国と一境
を為し、名張川ナバリ衆水を集めて北流し山城国に入る。

(南都)

大和古倭に作る、倭は漢魏人本邦を称したる異名なり
と雖、取りて夜万止ヤマトの訳に仮りたり。又日本に作る、
此地即本邦の都邑なりければ義に因りて訓じたり。神
武帝磐余檀原宮に居たまひ神日本磐余彦の号あり、磐
余即畝傍山の辺の総名にして倭の古国も此地に限れり。
(今高市郡磯城郡蓋山処の義に出づ)後葛城国ツゲ關鷄国
層富等ソフに及ぼし、地方の総名と為ると俱に亦国朝の大
号と為る。孝德天皇大化改新の比定めて六県と為れり、
日本書紀云「大化元年八月、於倭国六県被遣使者、宜
造戸籍并校田畝」、書紀集解、引延喜式祈年祭祝詞云
「御県に坐皇神前に白、高市葛木十市志貴山辺會布ソフと
御名は白て、此六県に云々」これなり。国郡制度定ま
るに及び大倭国は前の六県を分ち十二郡と為し、宇陀

Example from the content of the *Dainihon Chimei Jisho*

The areas recorded in *Dainihon Chimeijisho* (*The Dictionary of Place Names in Greater Japan*)

- ◆ It lists the information by each region from Volumes 1 to 8.
- ◆ Volume 1 General Theory and Index
- ◆ Volume 2 Kamigata (Kinki region nowadays)
- ◆ Volume 3 Shikoku, Chugoku
- ◆ Volume 4 Saigoku (Kyushu region nowadays)
- ◆ Volume 5 Togoku, Hokkoku (Chubu region nowadays)
- ◆ Volume 6 Bando (Kanto region nowadays)
- ◆ Volume 7 Ou (Tohoku region nowadays)
- ◆ Volume 8 Ryukyu, Taiwan, Hokkaido, Karafuto (Sakhalin)

*The first edition comes with 11 volumes, more than 5,580 pages,
12 million characters

Total number of place names (*kanji* and *kana*)
in the index of the *Dainihon Chimei Jisho*

	地名数
日本(Japan)	52,547
北海道(Hokkaido)	2,585
琉球(Ryukyu)	879
その他(Others)	49,083
樺太(Sakhalin)	467
台湾(Taiwan)	942
合計(Total)	53,956

Transition of number of cities, towns and villages

	(1)	(2)	(3)	(4)
1888.12		----- 71,314 -----		71,314
1889.12	39	----- 15,820 -----		15,859
1947.8	210	1,784	8,511	10,505
1956.4	495	1,870	2,303	4,668
1965.4	560	2,005	827	3,392
1995.4	663	1,994	577	3,234
2003.4	677	1,961	552	3,190
2005.4	739	1,317	339	2,395
2006.4	779	844	197	1,820
2008.4	783	812	193	1,788

(1) Number of cities

(2) Number of towns

(3) Number of villages

(4) Number of cities, towns and villages

- ◆ **Detail explanation of the historical studies and change of country names, county names, names of mountains, rivers, lakes, and harbors.**
- ◆ **The index records 53,956 place names**
 - *Kanji, kana* (Japanese phonetic characters) , and Romanization of place names.
 - Geographical relations of country, county, and village.
 - Relations with the current city, town, and village.
 - Providing latitude and longitude.

Data elements to be constructed (1)

- ◆ ID: unique number for each record
- ◆ Place name: in *kanji*, *kana*, and romanization
- ◆ Name of county: the old name of the counties with that place name written in *kanji*, *kana*, and romanization
- ◆ Name of country: the old name of the country with that place name written in *kanji*, *kana*, and romanization
- ◆ Identification based on comparison: recording current names of the place names in *kanji*, *kana*, and romanization
- ◆ Form: classify whether the location of the place name is a dot, line, or plane
- ◆ Method to record a location: dots, lines, rectangles, or shapes with multiple angles

Data elements to be constructed (2)

- ◆ Latitude: latitude of a representative location of the place name
 - ◆ Longitude: longitude of a representative location of the place name; methods for recording follow latitude
 - ◆ Attributes of place names: mountains, rivers, lakes, harbors, buildings(shrines, temples and so on), bridges, etc
 - ◆ Last year of the time-period: the last year that the place name was used (yymmdd)
 - ◆ First year of the time-period: the first year that the place name became effective (yymmdd)
 - ◆ Volume numbers of *Dainihon Chimeijisho (The Dictionary of Place Names in Greater Japan)*, corresponding pages with an intention of expanding the database
- * Note: information related to latitude, longitude, and identification based on comparison

Number of place names attribute (1)

Attribute classification	Attribute Number	Place Name Attribute	Number
Administrative place name	1	Province	84
	2	Country	382
	3	County	1706
	4	Town	1246
	5	Village	7785
	6	Gou (few villages)	5009
	7	Sato (small village)	108
	8	Aza (Name of division in village)	12983
	9	Etc.	1555

Number of place names attribute (2)

Attribute classification	Attribute Number	Place Name Attribute	Number
Geographical features	31	Mountain山・岳	2716
	32	Mountainous district	38
	33	Mountain range	22
	34	Plateau	24
	35	Hill	155
	36	Basin	4
	37	Plains	70
	38	Island	753
	41	Pass	304
	43	Slope	171
	44	Valley	190
	45	Road, Highway	97
	46	Beach	702
47	Delta, Alluvial fan	12	
49	Etc.	523	

Number of place names attribute (3)

Attribute classification	Attribute Number	Place Name Attribute	Number
	▪	▪	▪
	▪	▪	▪
	1 - 92	Kasei-zu	32,270
	91	Shrine(Shikinai-sha)	2,842
	92	Temple	78,558
Total			166,495

An Example of Document Type Definition (XML) of *Dainihon Chimeijisho*

*XML(Extensible Markup Language) data format (1)

```
<?xml version='1.0' encoding="UTF-8"?>
```

```
<togo>
```

```
<vol no='a24(Volume)'>
```

```
<item pid='a01(Number)'>
```

```
<country>a04(Name of a country)</country>
```

```
<county reading='a06(County reading)'>a05(County name)</county>
```

```
<placename reading='a03(ㄟㄣ)'>a02(Place name)</placename>
```

```
<pname1>a09/a12(Current Place name a)</pname1>
```

```
<pname2>a10/a13(Current Place name b)</pname2>
```

```
<pname3>a11/a14(Current Place name c)</pname3>
```

```
<shp>a07(Shape)</shp>
```

```
<loc>a08(Positional description method)</loc>
```

```
<lat>a15(Latitude 1)</lat>
```

```
<long>a16(Longitude 1)</long>
```

```
<lat2>a19(Latitude 2)</lat2>
```

```
<long2>a20(Longitude 2)</long2>
```

An Example of Document Type Definition (XML) of *Dainihon Chimeijisho*

***XML(Extensible Markup Language) data format (2)**

```
<altname>a23(Current name)</altname>  
  <parent>a26(Parent name)</parent>  
  <attribute>a27(Place name attribute)</attribute>  
  <page>a25(Page)</page>  
  <remarks>a28(Remarks)</remarks>  
  <remarks2>a29(Remarks 2)</remarks2>  
</item>  
</vol>
```


◆ 設計したXMLの例

```
<?xml version="1.0" encoding="UTF-8" ?>
- <togo>
- <vol no="2">
    .
- <item pid="43024">
    <itemcountry>山城</itemcountry>
    <itemcounty>宇治郡</itemcounty>
    <countyreading>ウジ</countyreading>
    <placename reading="マンブクジ">万福寺</placename>
    <pname1>宇治市</pname1>
    .
    <shp>1</shp>
    <loc>1</loc>
    <lat>34.54.53</lat>
    <long>135.48.22</long>
    <altname>黄檗山萬福寺</altname>
    <parent />
    <attribute>13</attribute>
    <page>239</page>
    <remarks />
</item>
```

注：紙面の関係で一部省略



Figure 3. Search window for Digital Gazetteer search system

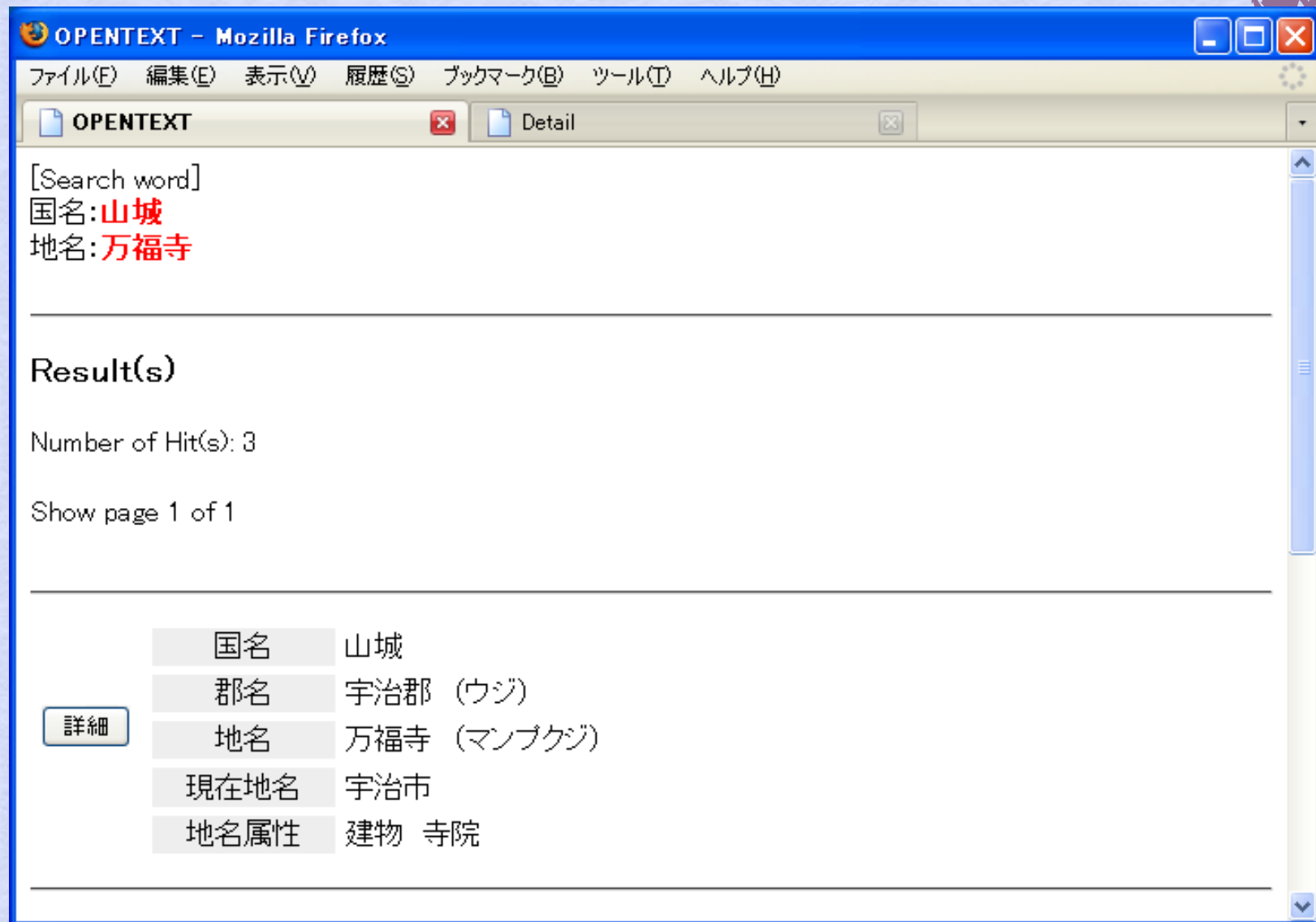


Figure 4. Search results display window for Digital Gazetteer search system



Figure 5. Detailed search results display window for Digital Gazetteer search system

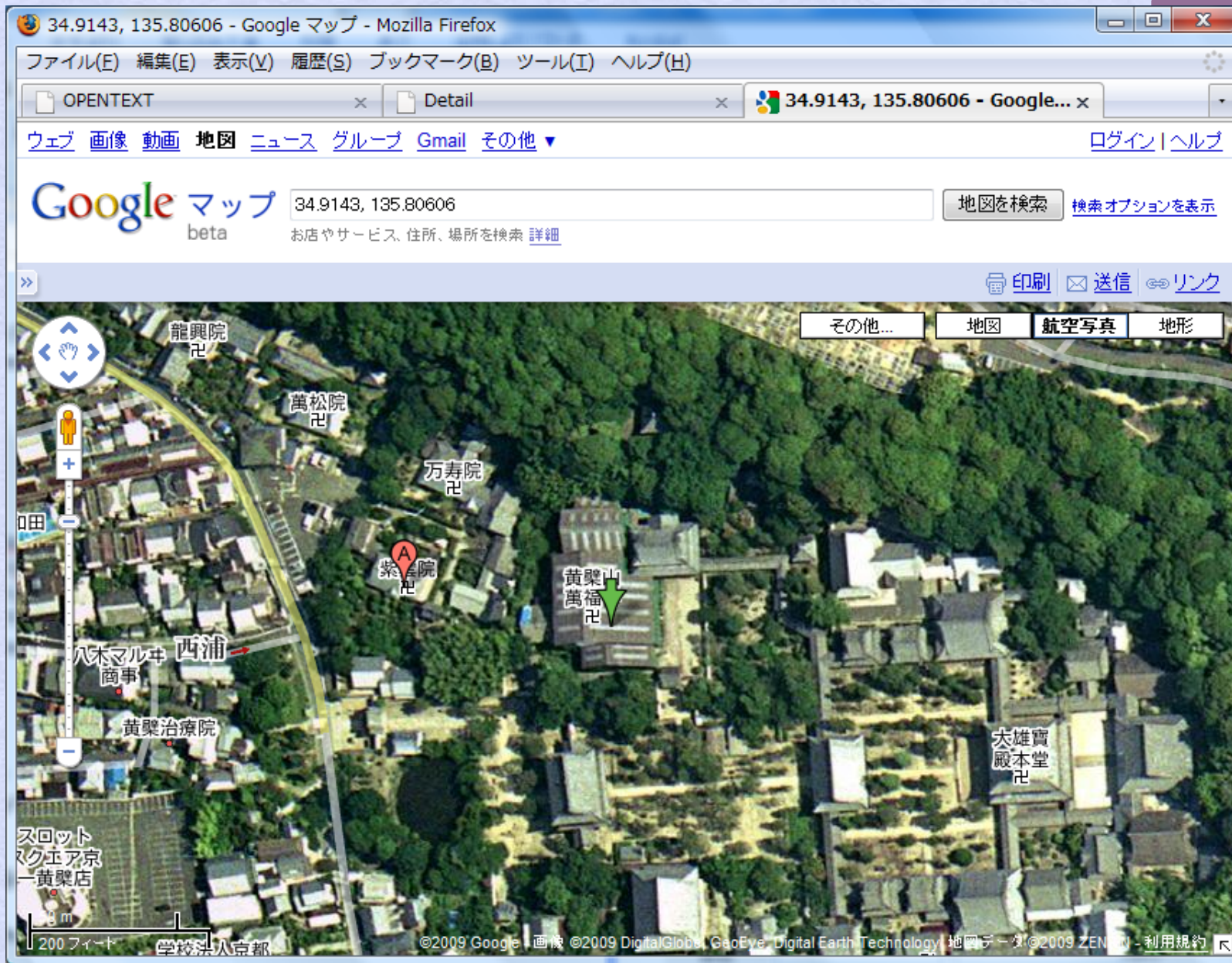


Figure 6. Google Maps display window for the location found in the search results

Construction of Topographical Maps and Place Names Database (1)

- ◆ The *Kasei-zu* (Kinki area) and *Jinsoku-zu* (Kanto area)
 - : 1:50,000 scale map of the Geographical Survey Institute
 - : The *Kasei-zu* and the *Jinsoku-zu* were the first surveyed maps covering the entire country
 - : 426 maps (Chart district)
- ◆ Each topographical map is provided with a 4-point coordinate system (geotiff format)
- ◆ Creation of Shp files of maps
 - : Topographical map scanning (600dpi,RGB,TIFF format)
 - : Administrative borders (polygon and line data)
 - : Water bodies (polygon and line data)
 - : Roads (line data)

Construction of Topographical Maps and Place Names Database (2)

- ◆ Place names extraction from map
: 32,270+ α (Kyoto, Nara, Hyogo, Osaka, Tokyo, Shiga, Wakayama, Okayama)
- ◆ The place name data are provided with latitude and longitude
- ◆ The topographical map database was built using Zoomify
: Zoomify allows large images to be enlarged, minimized, moved and so on using Flash and converted into a format that enables viewing in a Web browser.

Table 2. List of *Kasei-zu* and *Jinsoku-zu* topographical maps

図郭名	測量年	発行年月日	リスト番号	白黒	種類	測量年	東	西	南	北
坊勢島	明28	M34.3.30	105-5-1	*	測図	明 28	134.7528903	134.5028903	34.5000000	34.6666667
寒霞溪	明30	M34.3.30	105-9-1	*	測図	明 30	134.5028903	134.2528903	34.5000000	34.6666667
明石	明29	M34.3.30	105-1-1	*	測図	明 29	135.0028903	134.7528903	34.5000000	34.6666667
洲本	明32	発行年月日記載なし	105-2-1	*	測図	明 32	135.0028903	134.7528903	34.3333333	34.5000000
由良	明29	発行年月日記載なし	105-3-1	*	測図	明 29	135.0028903	134.7528903	34.1666667	34.3333333
鳴門海峡	明29	発行年月日記載なし	105-7-1	*	測図	明 29	134.7528903	134.5028903	34.1666667	34.3333333
播州赤穂	明28	M34.3.30	104-12-1	*	測図	明 28	134.5028903	134.2528903	34.6666667	34.8333333
上郡	明30	M34.3.30	104-11-1	*	測図	明 30	134.5028903	134.2528903	34.8333333	35.0000000
佐用	明30	M34.3.30	104-10-1	*	測図	明 30	134.5028903	134.2528903	35.0000000	35.1666667
坂根	明31	M34.3.30	104-9-1	*	測図	明 31	134.5028903	134.2528903	35.1666667	35.3333333
大屋市場	明31	M34.3.30	104-5-1	*	測図	明 31	134.7528903	134.5028903	35.1666667	35.3333333
山崎	明30	M34.3.30	104-6-1	*	測図	明 30	134.7528903	134.5028903	35.0000000	35.1666667
龍野	明30	M35.6.30	104-7-19		測図	明 30	134.7528903	134.5028903	34.8333333	35.0000000
姫路	明28	M34.3.30	104-8-1	*	測図	明 28	134.7528903	134.5028903	34.6666667	34.8333333
高砂	明29	M34.3.30	104-4-1	*	測図	明 29	135.0028903	134.7528903	34.6666667	34.8333333
北条	明30	M34.3.30	104-3-1	*	測図	明 30	135.0028903	134.7528903	34.8333333	35.0000000
生野	明30	M34.3.30	104-2-1	*	測図	明 30	135.0028903	134.7528903	35.0000000	35.1666667
但馬竹田	明31	M34.3.30	104-1-1	*	測図	明 31	135.0028903	134.7528903	35.1666667	35.3333333
若桜	明31	M34.3.30	103-12-1	*	測図	明 31	134.5028903	134.2528903	35.3333333	35.5000000

Digital Gazetteer - Mozilla Firefox

ファイル(E) 編集(E) 表示(V) 履歴(S) ブックマーク(B) ツール(I) ヘルプ(H)

http://pnc-ecai.oiu.ac.jp/cgi-bin/chimei/ochimei.cgi

このパスワードを記憶させますか? 記憶する(R) このサイトでは記憶しない(E) 今回は記憶しない(N) x

Interactive Searching of 大日本地名辞書

OPEN TEXT CORPORATION
infocom

Search word

国名
 郡名 (ヨミ)
 地名 (ヨミ)
 現在地名
 地名属性

検索開始

- 選択なし
- 行政地名
- 建物
- 水部
- 地形
- 名所旧跡
- その他
- 地名以外
- 追加
- 式内社データ
- 寺院名鑑
- 仮製図・迅速図

Search results display window for Digital Gazetteer search system
(showing results for keyword “Oguranoike : 巨椋湖”)

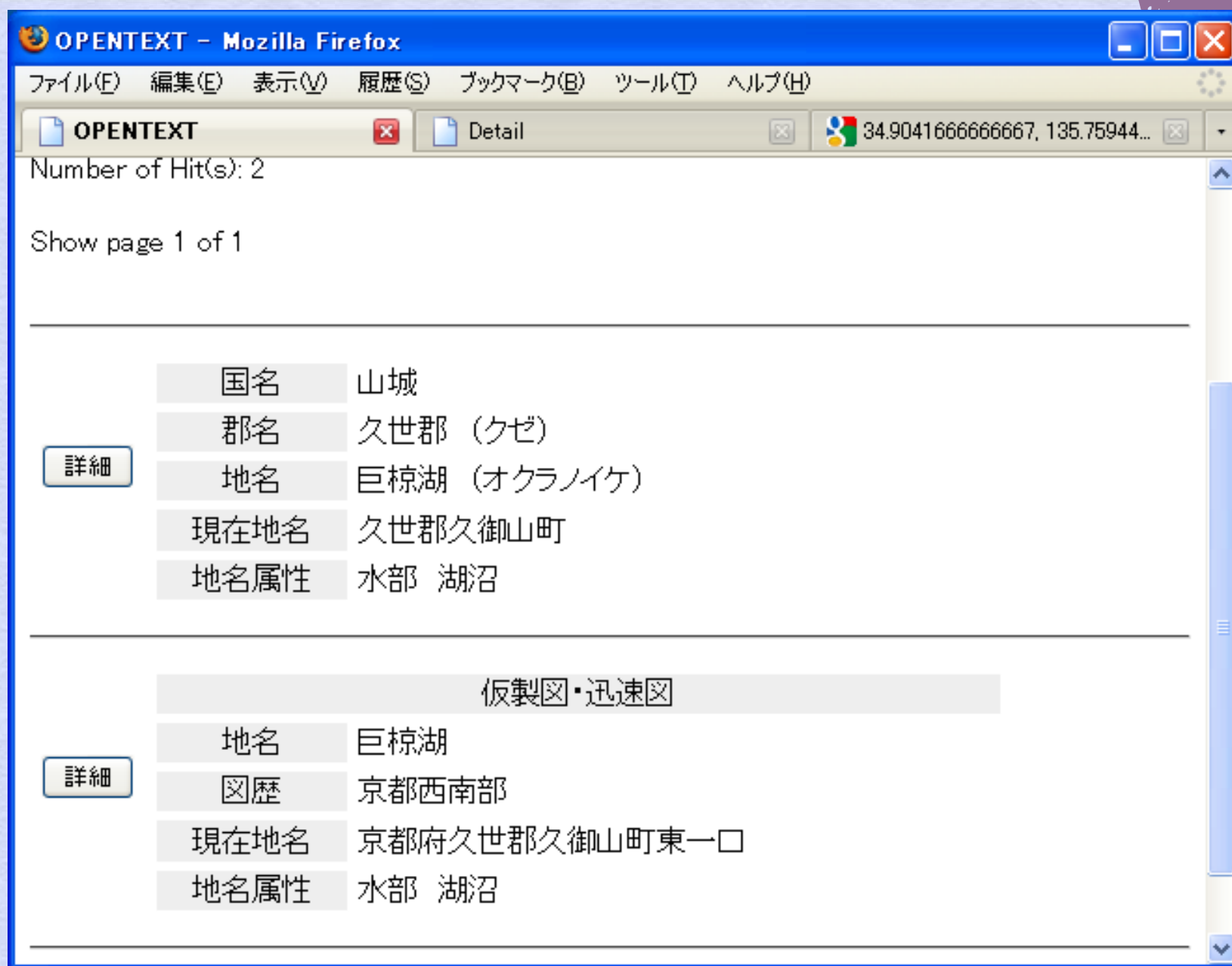
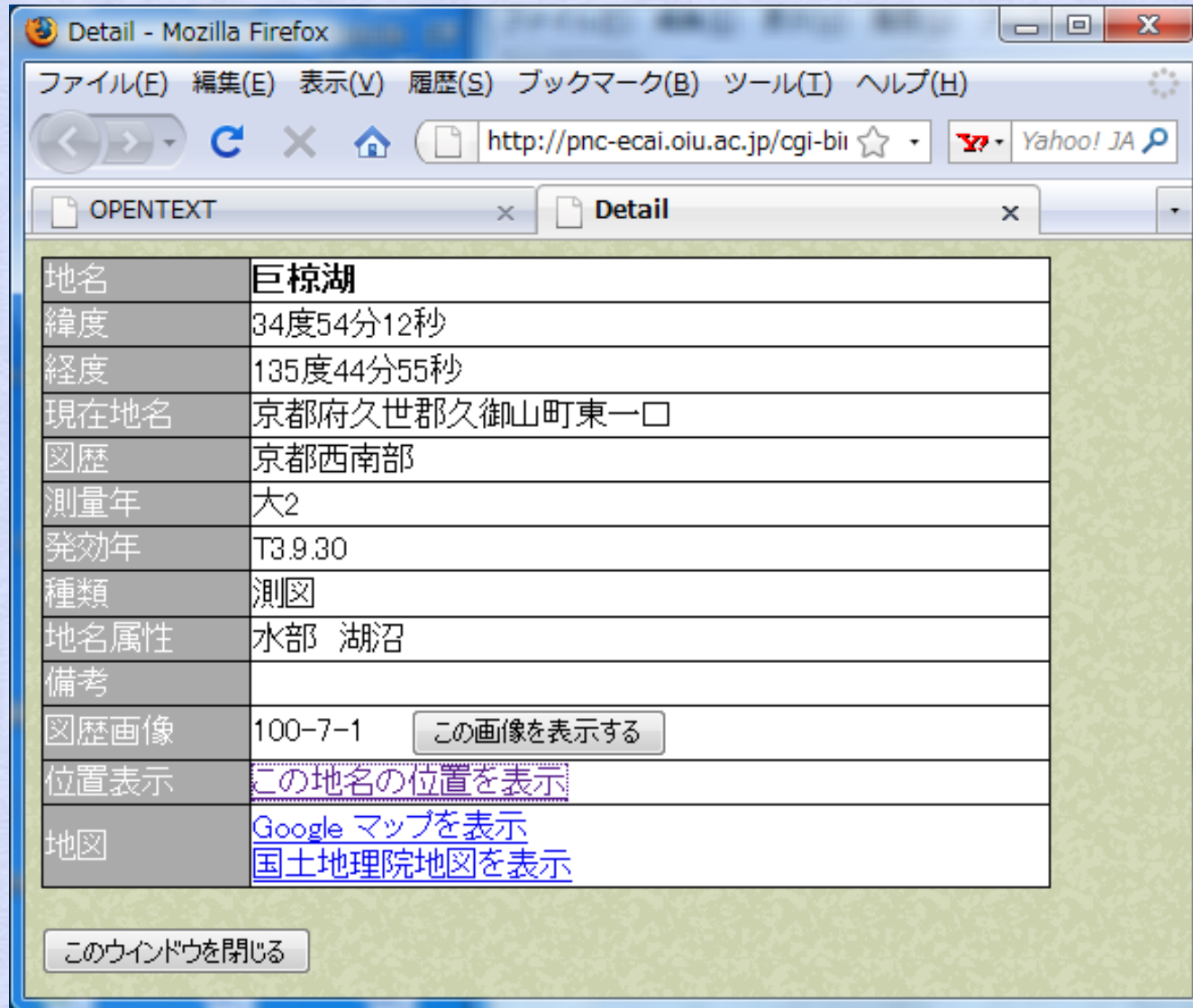


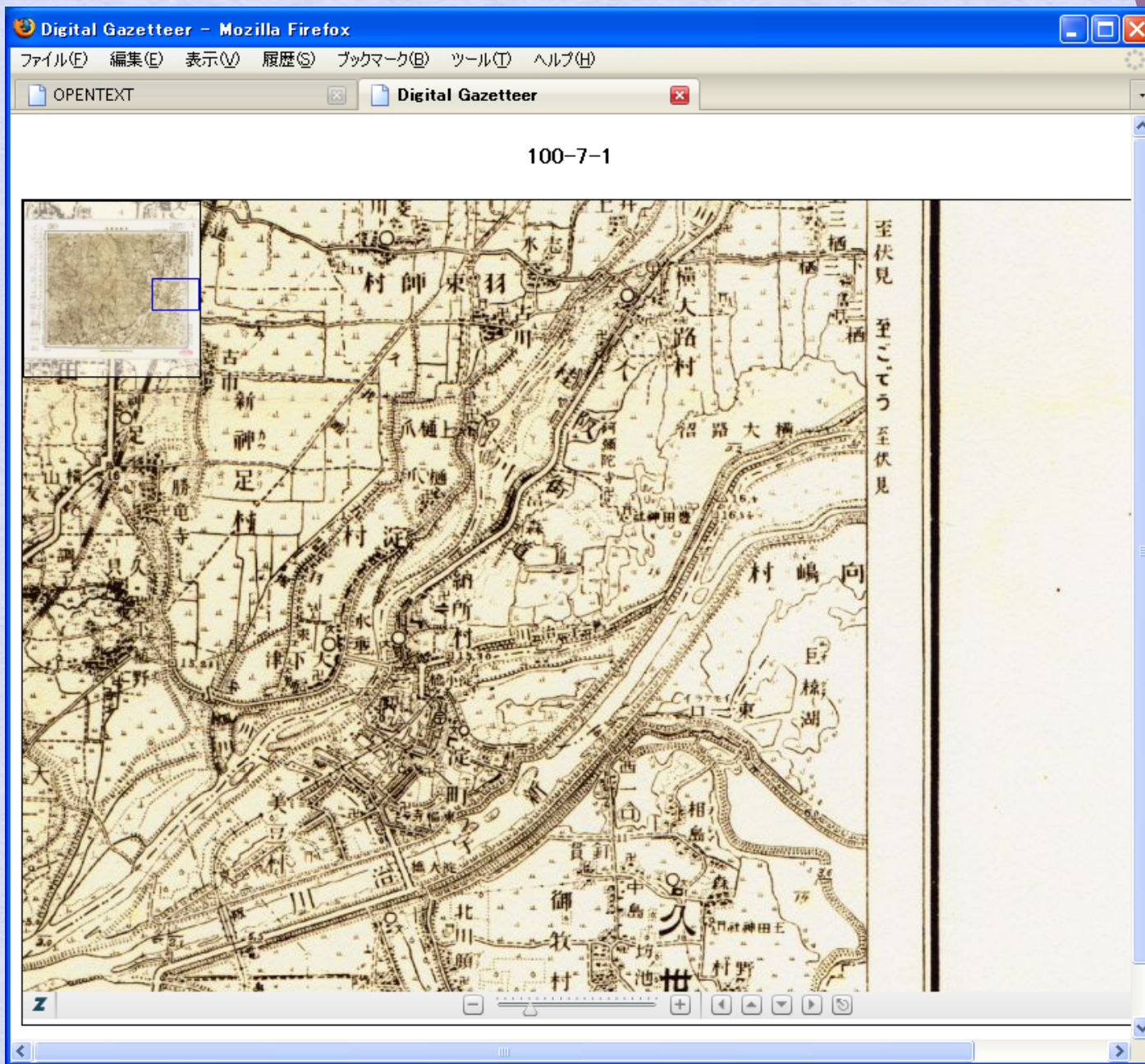
Fig. 7 Detailed search results display window for Digital Gazetteer search system (showing results for keyword "Oguranoike")



Detailed search results display window for Digital Gazetteer search system (showing results for keyword “Oguranoike“)



Google Maps display window for the location of Oguranoike (巨椋湖)



Kasei-zu display window for location found in search results
(Oguranoike)

Mozilla Firefox

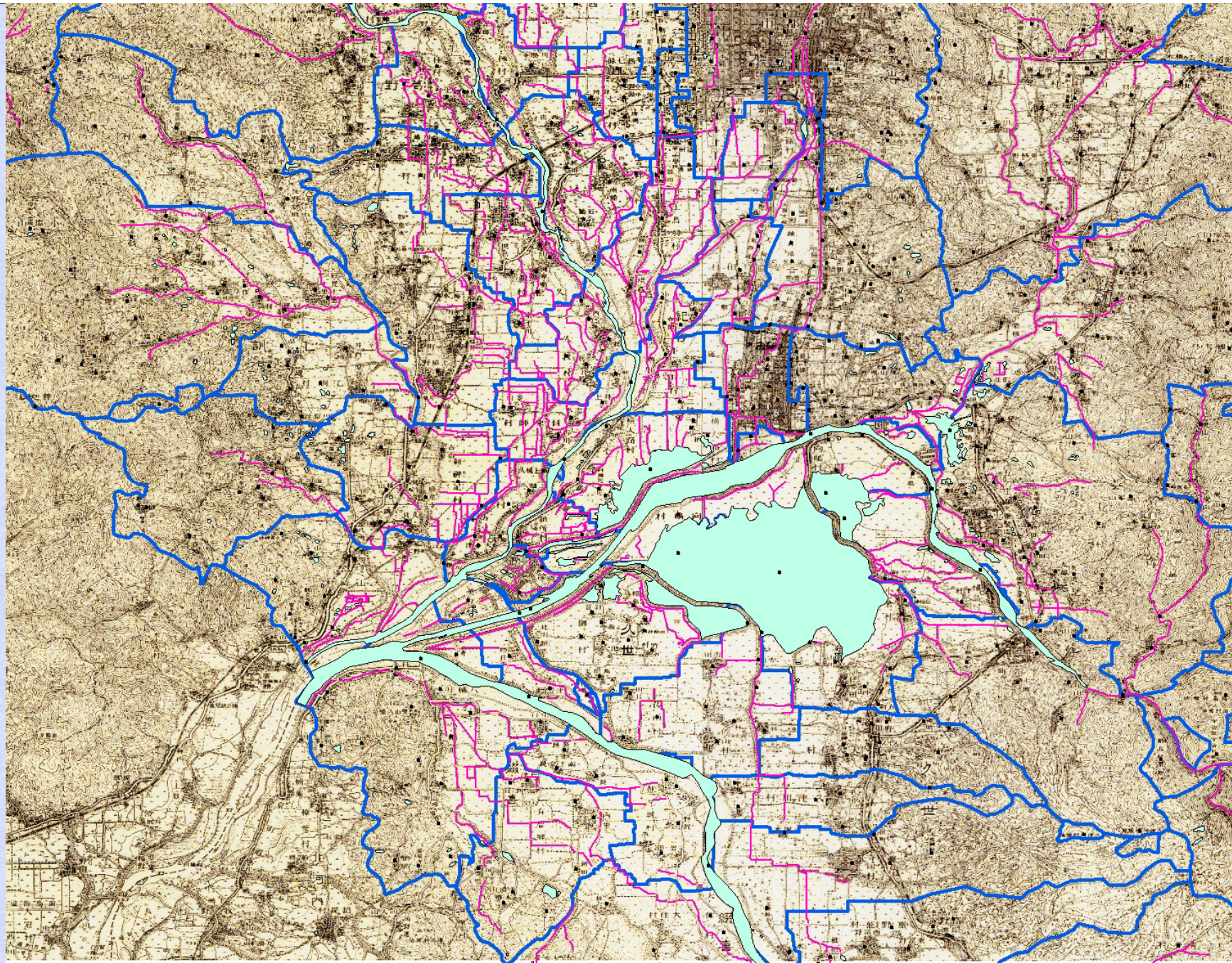
ファイル(E) 編集(E) 表示(V) 履歴(S) ブックマーク(B) ツール(I) ヘルプ(H)

http://pnc-ecai.oiu.ac.jp/cgi-bin/chimei/mapput.cgi?mnum=100-7-1&ix=34.90337173000&iy=135

OPENTEXT Detail http://pnc-...00&name=巨椋湖

巨椋湖 閉じる

Kasei-zu display window for location found in search results
"Oguranoike" (red circle) : Jpeg File



Kasei-zu display window of Oguranoike surrounding

Kyoto-Nara-Hyogo-090714-Map-3.mxd - ArcMap - ArcView

ファイル(E) 編集(E) 表示(V) ブックマーク(B) 挿入(I) 選択(S) ツール(I) ウィンドウ(W) ヘルプ(H)

1:91,707

レイヤ

- kyoto-nara-hyogo
 - suiikikai
 - gyouseikai
 - 水部_ライン_奈良県
 - 水部_ライン_兵庫県
 - 水部_ライン_京都府
 - 水部_奈良県
 - 行政界_奈良県
 - 水部_兵庫県
 - 行政界_兵庫県
 - 水部_京都府
 - 行政界_京都府
- 100-7-1geo2.tif
 - RGB
 - Red: Band_1
 - Green: Band_2
 - Blue: Band_3
- 100-3-1geo2.tif
 - RGB
 - Red: Band_1
 - Green: Band_2

表示 ソース 選択

図形の調整(D) MS UI Gothic 10 B I U

個別属性表示

レイヤ: <最上位レイヤ>

kyoto-nara-hyogo-poin
巨椋湖

位置: [135.766036 34.899850 度(10進)]

フィールド	値
FID	2682
Shape	ポイント
経度	135.766267
緯度	34.900073
地名	巨椋湖
地名属性	23
備考	

1 フィーチャを検索しました

Kasei-zu display window of Ogura-no-ike surrounding

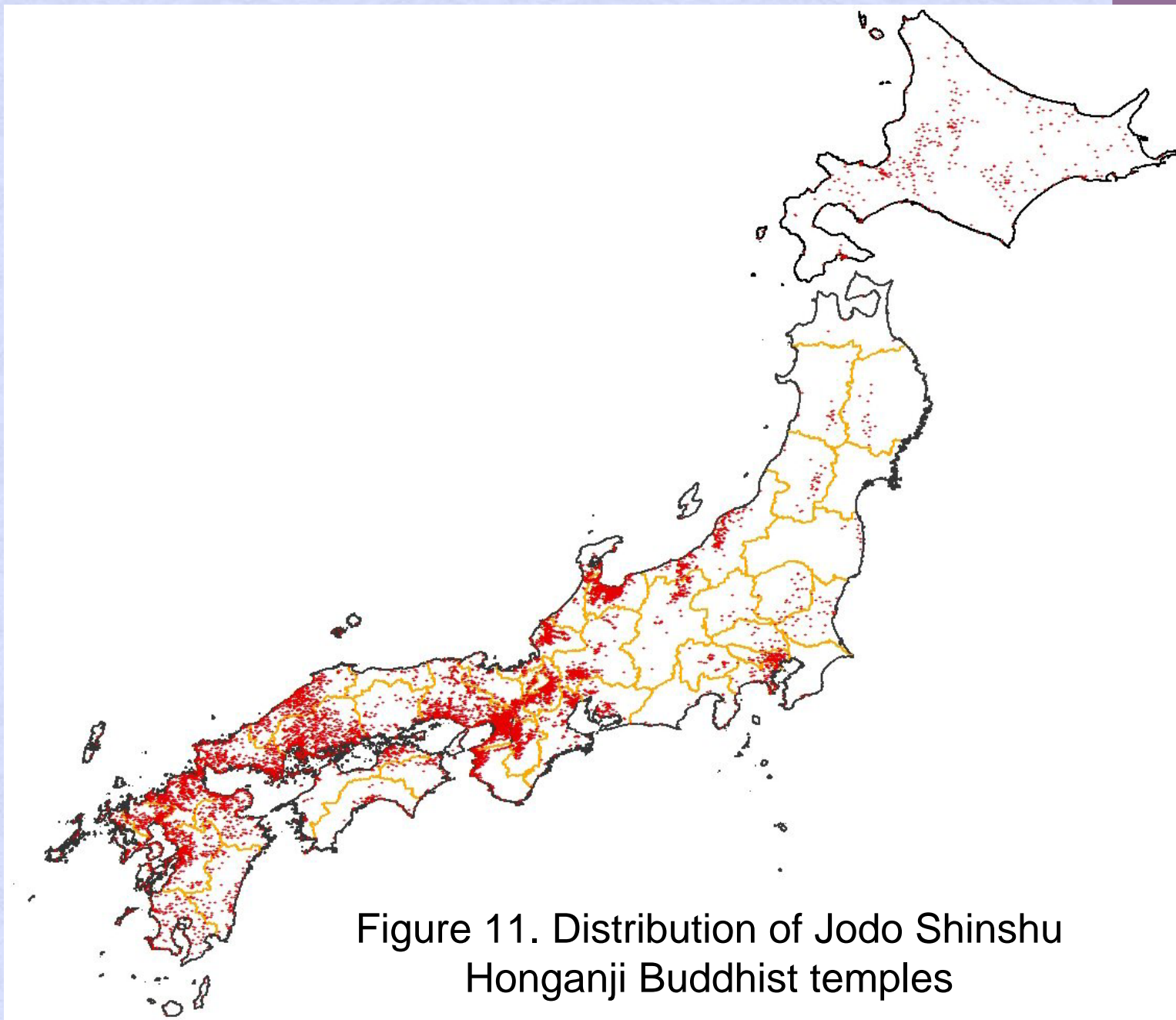


Figure 11. Distribution of Jodo Shinshu
Honganji Buddhist temples

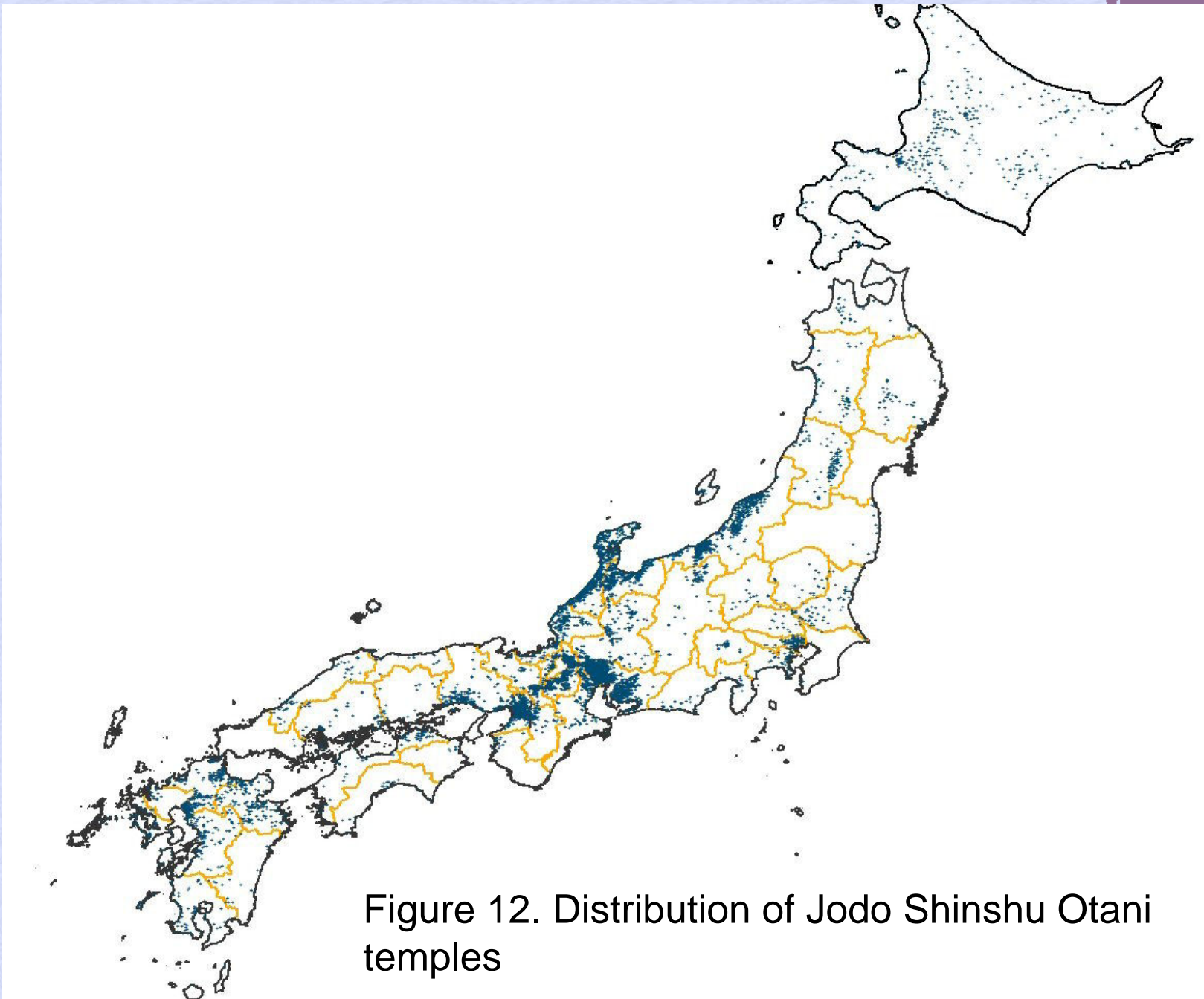


Figure 12. Distribution of Jodo Shinshu Otani temples

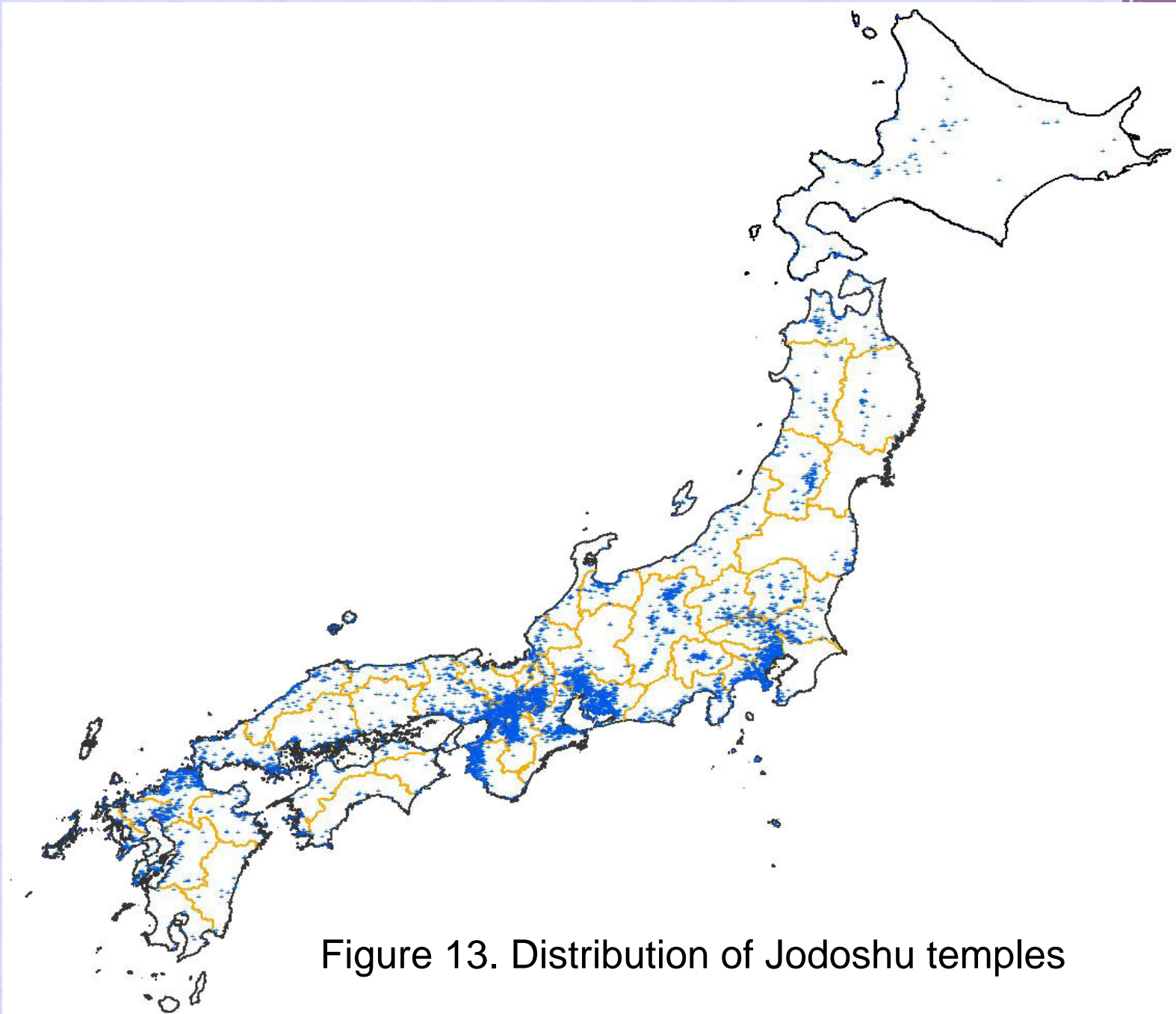


Figure 13. Distribution of Jodoshu temples

Number of data of each dictionary

- ◆ *Dainihon Chimeijisho (The Dictionary of Place Names in Greater Japan)* : 49,557
(Parentheses : *Dainihon Chimeijisho*)
- ◆ *Shikinai-sha*(式内社:Shrine) : 2,842 (3,407)
- ◆ *Jiin-Meikan*(寺院名鑑 : Temple) : 78,588 (3,395)
- ◆ *Kasei-zu, Jinsoku-zu* : 32,270+ α
- ◆ *Kyuko-Kyuryo Torishirabecho*
(旧高旧領取調帳) : 65,210

* The *Kyuko-Kyuryo Torishirabecho* :the official document concerning the volume of rice production of each village in each feudal clan at the end of the Edo period

* We are planning integration with the *Kyuko-Kyuryo Torishirabecho*.

* <http://pnc-ecai.oiu.ac.jp/chimei/>

This database is available on the Internet.



Thank you