China Historical GIS: Methods for Georeferencing Historical Data

Merrick Lex Berman

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research partners:

Fudan University, Center for Historical Geography (China)

Harvard University, Harvard Yenching Institute (USA)

Griffith University, ACASIAN (Australia)

Academia Sinica, Institute for Info Science (Taipei)
A GIS is "an organized collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information."


drawing: Michael Halbert
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**CHGIS data entry table**
Tan Qixiang’s “Historical Atlas of China”
New administrative unit datasets

Map sources

Settlements as points

Boundary polygons

CHGIS base dataset layers
rectifying CHGIS points to ArcChina Basemap

historical point
“snapped” to
ArcChina point

historical point
not the same as
ArcChina point

ArcChina Points (red) over CHGIS Points (yellow)
rectifying boundaries to ArcChina Basemap
historic rivers compared with ArcChina rivers
Using CHGIS spatial data with other GIS data

CHGIS layers

hydro layers

DEM layers

Using CHGIS spatial data with other GIS data
historic rivers and ArcChina rivers overlay
overlay example
select polygon for your focus area

select area of interest

convert to “shapefile”

select polygon for your focus area
export attribute data for focus area to TEXT file

add a new column to the TEXT file

enter new values in the new column, then REJOIN to original GIS focus area shapefile

adding your own data to polygons
create chloropleth map based on your data
use the focus area polygons to “select by theme” and create a shapefile for points that fall within those polygons.
export attribute data for points

add new data related to points in your working table

relating your data to points
size, color, shape of points can be used to show spatial distribution patterns in your data.
approximate boundaries can be automatically generated using “central points” inside of any polygon

generate Thiessen polygons
Thiessen polygons combined into larger areas

the sub-boundary sets can be merged back together into larger areas
Shanxi - Prefectures
with Thiessen polygons for counties

counties in each prefecture
Ding Population (1820) normalized by area

population distribution – normalized by area
Changping Quota normalized by area

grain reserves distribution - by area
Thiessen polygons – using all village points
examining village Thiessen polygons in one prefecture
compare with county polygons using overlay
do the villages fall in the correct counties?
usefulness of historical GIS data:

• overlays historical and contemporary data
• models distribution across space
• visualization tool for georeferenced data

caveats of using historical GIS data:

• a platform for comparisons, not 100% accurate
• approximate boundaries are models, not representations of real spatial features
• even the best historical evidence results in approximate boundaries, while GIS does not adequately represent the “fuzziness” or the degree of inaccuracy being depicted

conclusion
China Historical GIS Project

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