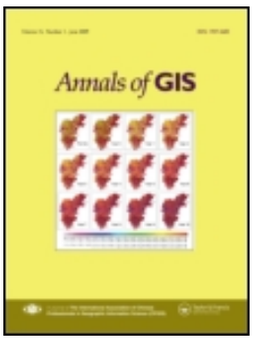

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GIS, prosopography and history

Peter K. Bol*

Department of East Asian Languages and Civilizations and the Center for Geographic Analysis, Harvard University, Cambridge, MA, USA

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This study of the early spread of Neo-Confucianism as an intellectual–social movement in southern China in the twelfth century applies geospatial analysis to a prosopographical study of the social networks of leading figures. By analyzing the spatial distribution of intellectual networks, we see that Neo-Confucianism was most successful in areas that had strong traditions of investment in education but that were generally marginal to the commercial economy of the times. The research draws on data from the China Biographical Database, which include data on the social associations, kinship, careers and addresses of over 40,000 Song dynasty figures and the China Historical GIS, a times-series database of administrative units from 221 BCE to 1911 CE. Intellectual history traditionally has focused on the transmission of ideas; network and spatial analysis helps explain why some areas were more receptive to certain ideas than others.

Keywords: China; history; HGIS; Song dynasty; social network analysis

Introduction

During the mid-twelfth century, a new kind of Confucianism, called the 'Learning of the Way' (*Daoxue*) and referred to here as 'Neo-Confucianism', began to spread among local literati, despite a generally unsympathetic court. In contrast to earlier forms of Confucianism, the new movement had well-defined leaders such as Zhu Xi, Zhang Shi and Lü Zuqian, who shared a vision focused on the cultivation of a common moral human nature, a new theory of learning and a new philosophical vocabulary, and who promoted new social institutions to put the teaching into practice. Neo-Confucianism was both an intellectual and a social movement among the elite. As will be shown below, the social networks that marked its spread had obvious spatial characteristics, and this suggests that an explanation for its spread needs also to account for the spatial pattern revealed by mapping its networks.

Attention to the networks among thinkers has played an important role in the study of later imperial thought, beginning with Huang Zongxi's study of Ming dynasty (1368–1644) Confucianism, followed by his study of Song (960–1279) and Yuan (1280–1367) scholarships as completed by Quan Zuwang and extensively supplemented by Wang Zicai and Feng Yunhao.[1] A case study in these texts takes a single person as the progenitor of a 'school' and then lists students and intellectual associates. This turned out to be a persuasive way of organizing information about intellectual trends and still continues to influence our study of intellectual history.

There is some truth to the notion that students make the teacher, that is, an intellectual figure is important because he has students and the students who make his reputation. But in the tradition of biographic writing it is also true that once a person becomes famous many people who had only a short encounter with him claim him as their teacher. This seems to me to explain why an analysis of 25,000 short biographies in Wang Deyi's index of Song biographical materials reveals that the one person who most often appears in the biography of others is Zhu Xi, about three times as often as all the runners up: Qin Kui, Su Shi, Wang Anshi, etc.[2] Even if we grant the claim to having been a student of Zhu, it does not necessarily follow that the individual in question ever, or continued to, share Zhu's views. This is evident from Chen Rongjie's (W.T. Chan's) identification of around 500 'disciples' of Zhu Xi, which does offer positive evidence that a person was at one point student, but rarely can show that there was the sort of continued relationship that Zhu had with his principle correspondents such as Lü Zuqian and Zhang Shi.[3] Still, claims made for a connection to Zhu Xi can at least be taken as an indicator of Zhu's importance. Thomas Wilson has argued convincingly that Neo-Confucians favoured a genealogical approach to intellectual affiliation, but also that they tended to retrospectively construct genealogies

*Email: pkbol@fas.harvard.edu

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in defence of their own positions, an activity much in evidence in the late Ming but also one in which Zhu Xi himself engaged in defining the origins of Daoxue, in which he problematically credited Zhou Dunyi with being an inspiration for the Cheng brothers, the real philosophical founders of Neo-Confucian philosophy in the eleventh century.[4]

However, there is a second feature to Huang Zongxi's studies, for not only did he identify an individual as the progenitor of a school, but he also frequently named the school by the place with which the progenitor was associated. It is this geographic approach to thinking about intellectual history and social networks that I wish to address. This is not a new idea. Over 50 years ago, He Yousen wrote on the 'Geographical Distribution of Intellectual Trends during the Northern and Southern Song' with a series of maps of intellectual affiliations.[5] Based on the scholarly affiliations of major intellectuals and taking into account where they were teaching, He Yousen described the shift in the centres of intellectual activity from the north to various regions in the south (Liangzhe, Fujian and Sichuan) and pointed out that this shift began during the Shenzong reign (1067–1085) and thus cannot be attributed to the loss of the North China plain to the Jin. Yang Yuan, in a 1982 article on the spatial distribution of chief and vice councillors, found the same southward shift dating to the Shenzong reign.[6] In short, the spatial distribution of political and intellectual leadership (in Northern Song, the two were closely related, with all but a handful of political leaders being products of the examination system) tracks the demographic and economic growth of the south.

Both these studies were based on careful prosopographical research and dealt with limited, but not insignificant, numbers of people. He Yousen made extensive use of the Records of Song and Yuan Scholarship and Yang Yuan had recourse to the table of councillors in the *Song History*. This study takes a different approach; it aims to maximize the number of people included and to look for patterns in larger trends. This approach, the value of which will be tested by what follows, depends on having access to extensive data.

The data

With one exception, this study relies on the China Biographical Database (CBDB), a data collection project that began with the late Robert Hartwell and has grown considerably through the combined efforts of the Institute of History and Philology at Academia Sinica, an editorial group led by Deng Xiaonan at the Center for Research on Ancient Chinese History at Peking University, and text-mining and database management group at the Fairbank Center for Chinese Studies at Harvard University led by Peter Bol and Stuart Shieber with Michael A. Fuller at the University of California Irvine.[7]

CBDB is a relational database, searchable online and freely available for download as a stand-alone database. It is constantly growing; as of June 2011, it had varying amounts of data on over 112,000 individuals, over 41,000 of whom were from the Song dynasty.[8] In brief, the project harvests data from various sources, including biographical indices such as Wang Deyi's revised electronic edition of the Song Biographical Index,[9] funerary inscriptions, Li Zhiliang's compilations of prefectural officials,[10] and literary collections. The crucial aspect of the database is that it organizes biographical data by category, making it possible for the user to query the database from many angles. The categories are as follows:

- Basic biographical data: name, dates and source
- Alternative names: courtesy names, studio names and so on
- Biographical addresses: place of birth, actual residence, registered residence, burial and so on
- Entry into office: examinations, protection privilege and so on
- Offices: ranks and offices held and address of local offices
- Kinship: any kinship relation
- Association: intellectual, literary, political and other associations between two people
- Writings: the titles of books, often with bibliographic classification, by an individual
- Social distinction: qualities that distinguished a person, such as poet, monk and civil official.

Organizing information in this fashion allows one to create sophisticated queries. For example, one could ask how many of the people from a certain place who entered office through protection privilege during a certain time period were related to each other through marriage. Moreover, database queries are not limited to the data gathered on an individual. Thus, for example, the database allows one to extend a social network from an individual to the associates of his associates or query kinship connections across as many generations as desired.[11] The only constraint is set by the existence of data and the extent to which it has been integrated into CBDB.

The way in which data are acquired has bearing on the contents. In 2008, the CBDB project switched from manually inputting data from individual biographies to the mining of as many as 25,000 biographies at once. Manual inputting meant that editors might discover suspect or conflicting accounts and resolve them by consulting the original sources. In contrast, the text-mining method produces thousands of data points by category (e.g. all 字 or courtesy names in the data set), which, after editorial review, are loaded into the database. Although efforts have been made to avoid duplication, data that conflict with the existing data are accepted, as when different sources

may offer different places of residence (CBDB in principle treats these as 'alternates', leaving only one place of residence for query purposes). The database thus reflects inconsistencies in the historical sources.

This approach aims at maximizing coverage rather than gathering data on individuals in depth. The assumption is that as new sources are mined over the years and more data are acquired the coverage of any individual will become ever more complete. This is already apparent in the number of social associations discovered for Song figures, which far exceeds what can be found in an individual's biography, but which would not exhaust what could be found by working through a person's literary collection and the hundreds if not thousands of poems addressed to others. Maximizing coverage, at the expense of in-depth prosopographical studies of individuals, gives many more data points than individual researchers could discover by themselves. CBDB assumes that thousands of examples will give us a fair sampling, despite missing data and inconsistencies.

Locating intellectual centres

This study uses the cumulative success of a given place in producing successful candidates for the highest civil service examination degree, the *jinshi* degree, as a proxy for the degree of investment in education in a given place. At the prefectural level, a quota ensured that the number of successful candidates sent on to the capital would be proportionate to the number of applicants. I suppose further that although the metropolitan examinations were blind, the rate of success was likely to reflect the number of participants from a given place and to favour those places that offered the best educational opportunities. Although, as John Chaffee has shown, it is possible to reconstruct the origins of a majority of degree holders from local gazetteers, thus favouring the southern provinces in Southern Song,[12] there are only complete degree rosters from 1148 to 1256. The counties that produced degree holders in 1148 are shown in Figure 1.

It is evident that in 1148, degree holders came from only a few circuits: Liangzhe East and West, Fujian, Jiangnan East and West and western Sichuan. The largest single group, however, was refugees from the north who still listed Kaifeng as their household registration.

Southern Song did not have regional quotas, and the spatial distribution in Figure 1 is not commensurate with the distribution of population or the placement of prefectural and county seats. But was 1148 an aberration? We can test this by generating two other data sets from CBDB. The first is a list of 4073 Northern Song (960–1126) *jinshi* in the database. This is not a record of all those who passed the examinations. This is instead a record of all those who passed the examination who entered the historical record. Thus, even if we suppose a different spatial distribution of degree holders, it would still be the case that what we

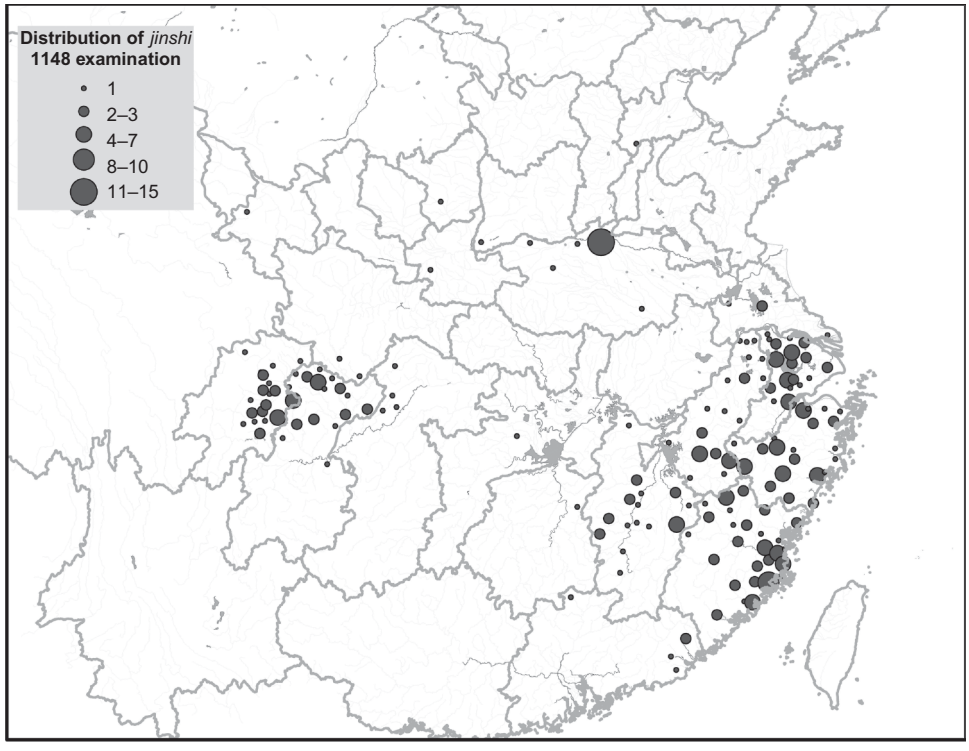

Figure 1. *Jinshi* from the 1148 examination.

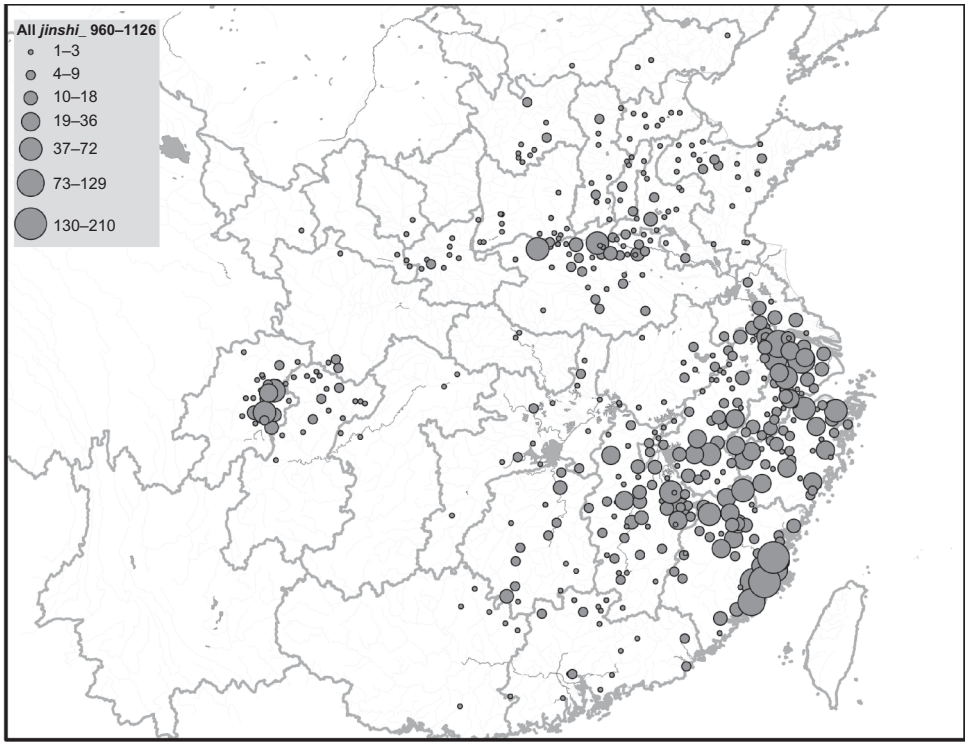

Figure 2. 4073 Northern Song *jinshi*.

are seeing in Figure 2 are the locations of those among them who in some way or another came to be recorded in historical sources.

If we exclude north China from consideration, the Northern Song map affirms the spatial distribution of 1148, with the exception that Northern Song included more men from the Middle Yangzi and the far south. Figure 3 is based on 6150 Southern Song degree holders in CBDB.

Now the clustering is even more pronounced. Mapping the location of Southern Song authors and academies, both of which are available in CBDB but not shown here, confirms the same pattern. This tells us that from a geographical perspective, the intellectual history of the period unfolded in the southeastern and western Sichuan circuits. If we want to look at intellectual movements in local society, we now know which prefectures and counties we should pay attention to.

Social networks

Social network analysis has become highly sophisticated and mathematically challenging, but is supported by a number of software packages. The challenge is to gather data on the associations between individuals. In contrast to work on contemporary networks, where data can be gathered from surveys and observation, such as in the study of friendship networks in a classroom of students, the analysis of social networks in historical studies comes up against the fact that although individuals meet many people during their lives, biographers typically cite only those they judge to be of consequence. However, historical network analysis can go beyond biographical records and find evidence of associations from other sources, such as lists of those purged for opposition to the court, coterminous membership in leading political organs and evidence of literary exchanges. Even limited data can provide insights into the relative centrality of those involved.[13]

This study is concerned with the geography of social connections: where the associates of an individual come from. The data in CBDB rarely tell us where and when a tie between two people is formed, but they do cite the evidence for a tie between them. Much of this evidence comes in the form of the writings one person composed for another, such as sacrificial prayers (祭文) and prefaces for books (序). The relationship can be described in two ways – if X wrote a sacrificial prayer for Y, then we can say that Y had a sacrificial prayer written for him by X – with one side being the sender and the other side the receiver. This can be deceptive. The writer of a sacrificial prayer does so after the death of the subject, but the writer of a book preface may do so long after the death of the book author or he may do so at the behest of the author during his or her lifetime. In either case, we can suppose that X had a tie to Y, although if might be a post-mortem tie.

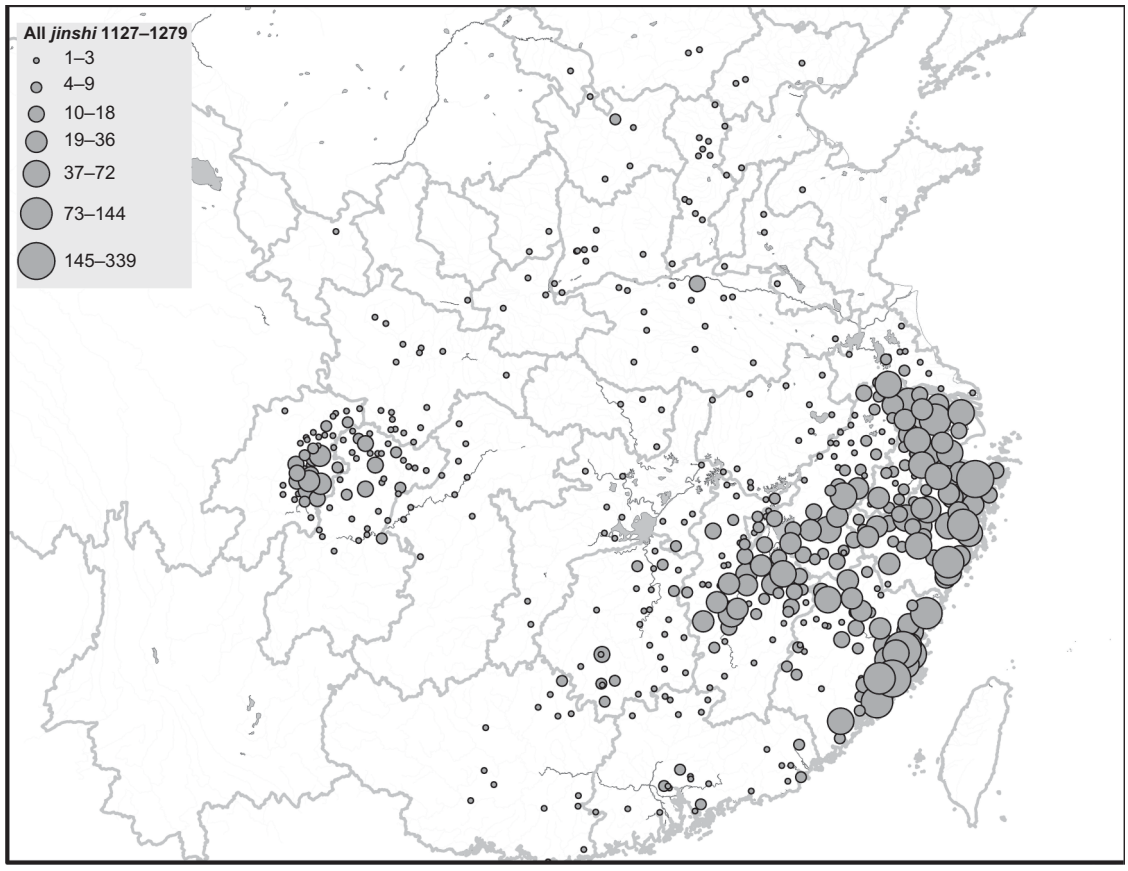

Figure 3. 6150 Southern Song *jinshi* (northern locations include Jin dynasty *jinshi*).

CBDB codes many different kinds of association, but as Table 1 shows, the bulk of the data refer to writings.

To illustrate this approach, and prepare a contrast for what we shall see in Southern Song, consider Figure 4, which compares the social networks of the two leading politicians and political thinkers, and opponents, of the latter half of the eleventh century, Wang Anshi 王安石 (1021–1086) and Sima Guang 司馬光 (1018–1086). For both of them I have included associates who (1) were not known to be opponents and (2) reached their 60th year somewhere between 1035 and 1115. Only unique persons are mapped to their places of residence; the map does not reflect the strengths of ties as indicated by number of documented associations between any two persons, although this information is available from the database.

Scholars have pointed out that it is too simple to see Wang as representing the south and Sima Guang the north, and it is evident here that both had numerous associates in Kaifeng and Luoyang, residential centres for bureaucratic families. We can see that both men had national networks, but it is also obvious (and a density analysis proves this) that their respective centres of gravity are distinctly southern and northern, and in fact among the hundreds of men associated with them there is only once the case of overlap between their respective associates (Fan Zhongyan).

Daoxue leaders and their networks in the late twelfth century

Zhu Xi 朱熹 (1130–1200), Zhang Shi 張栻 (1133–1180) and Lü Zuqian 呂祖謙 played important roles in the spread of the Learning of the Way (Daoxue) or Neo-Confucianism during the latter half of the twelfth century. They knew each other well, were in frequent correspondence with each other and collaborated on scholarly projects. At first glance, the distribution of their associates (excluding their critics) in Figure 5 resembles the distribution of *jinshi* degree holders, as we might expect.

Turning to the southeast in greater detail, however, we see that the distribution through the southeast is not uniform.

When we break this down into three separate maps, we see that the associates of Lü Zuqian residing in Wu zhou, of Zhang Shi residing in Heng zhou and of Zhu Xi residing in Jianning fu were more tightly clustered than Figure 6 at first suggests.

Table 1. Social associations in CBDB with over 100 instances, showing only one direction.

Number of records in CBDB	Social association	社會關係
8039	Epitaph written for	為 Y 作墓誌銘
3936	Postface written for book by	為 Y 所著書作跋
3815	Prefaced book by	為 Y 所著書作序
2471	Sacrificial prayer written for	為 Y 作祭文
2235	Departure note sent to	為 Y 作臨別贈言(送別詩、序)
2034	Building inscription composed for	為 Y 之建築物題詠、記、命名
1366	Presented literary composition as gift to	贈詩、文
1011	wrote colophon to the writings of	為 Y 之詩文作跋
987	Friend of	友
928	Recommended	推薦
868	Tomb stone (mubiao) written for	為 Y 作墓表
811	Biographer of	為 Y 作傳
772	Postscripted calligraphy or painting of	為 Y 之書、畫作跋
626	Menren of	為 Y 之門人
586	Funerary stele written for	為 Y 作神道碑
564	Biographical sketch (xingzhuang) written for	為 Y 作行狀
556	Duets composed with	相唱和
546	Student of	為 Y 之學生
503	Portrait eulogy written for	為 Y 作畫贊(畫像記)
491	Buddhist temple stele written for	為 Y 作佛寺記
433	Explanation of capping name (zixu or zishuo) composed for	為 Y 作字說、名述
430	Elegy written for	為 Y 作挽詩、詞
407	Lamentation prayer written for	為 Y 作哀辭
401	School stele written by	學記（書院記）由 Y 所作
400	School stele written for	為 Y 作學記（書院記）
370	Shrine inscription written for	為 Y 作祠記
355	followed	從 Y 遊
350	Praised or admired	欣賞/器重
317	Personnel administration (CJ)	(暫時保留，待刪除：吏部供職)
254	Studied with	從 Y 學
237	Ancestral stele or records written for	為 Y 作世系碑記
231	Served in the same bureau with	同僚
226	Impeached	彈劾
223	Congratulatory note sent to	向 Y 致賀
217	Yuanfu coalition member	元符上書入籍者
217	Friend in the same graduating class	同年友
203	wrote preface for the literary works of	為 Y 所作詩文作序
203	preface to literary works was written by	詩文序由 Y 所作
188	Discussed scholarship with	論學
176	Opposed or attacked	反對/攻訐
172	Purged	排擠
167	Tongxue was	同學、同門
164	Posthumous name essay written for	為 Y 作謚議
146	Retainer of	為 Y 之門客
132	Disciple (dizi) of	為 Y 之弟子
127	praised the political accomplishments of	稱道 Y 之政績
125	Sent letter to	致書
120	Listed in Yuanyou coalition register	入元祐黨籍者
119	Member of the school of	為 Y 學派的成員
117	Study motto for	為 Y 作齋、堂銘
112	Officer under command of	為 Y 之部將
112	Patron of (= Client was)	是 Y 的恩主
104	proceeded with (friendship)	與 Y 遊

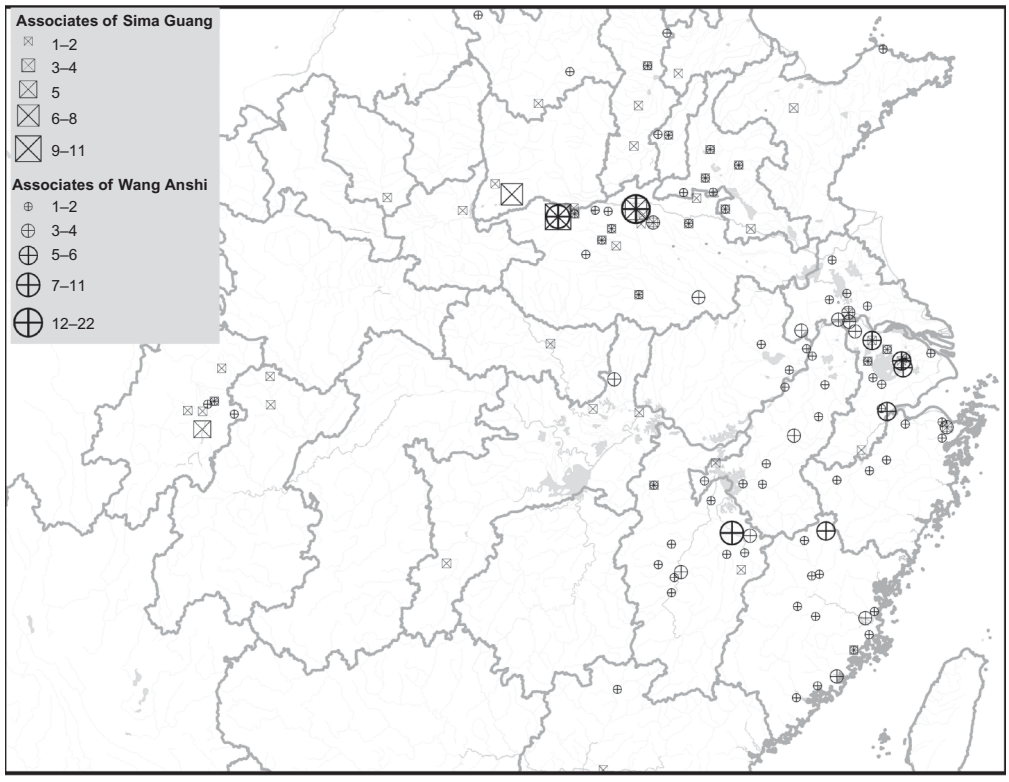

Figure 4. Places of residence of associates of Wang Anshi and Sima Guang, for associates reaching 60 *sui* between 1035 and 1110, excluding their respective opponents.

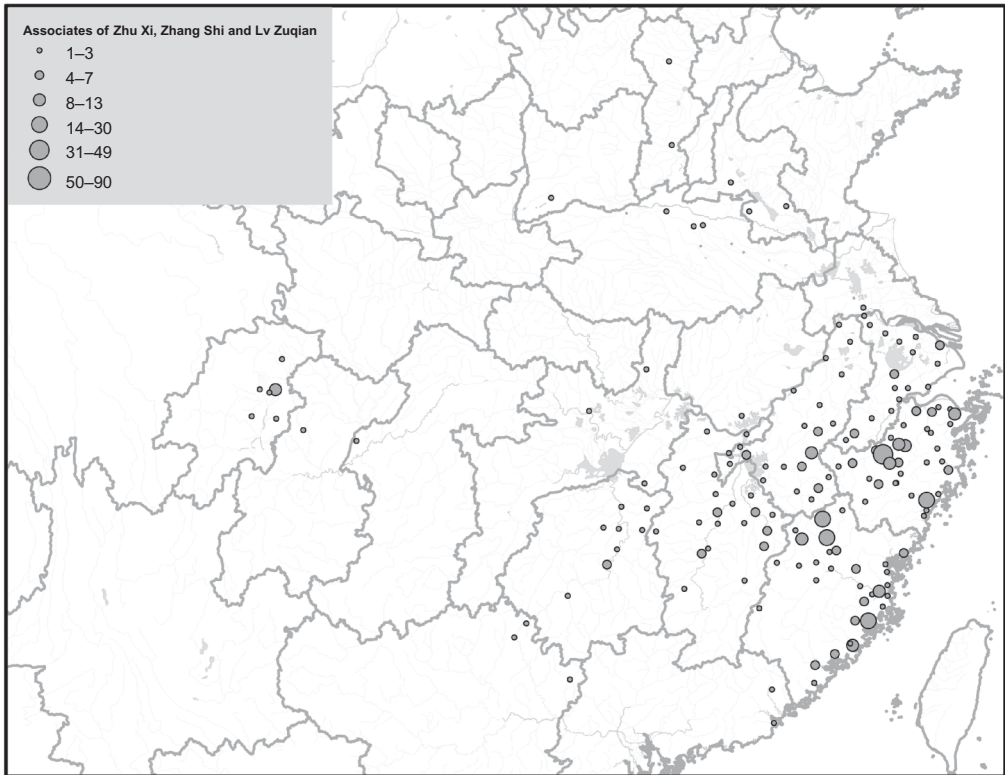

Figure 5. Distribution of associates of Zhu Xi, Zhang Shi and Lü Zuqian.

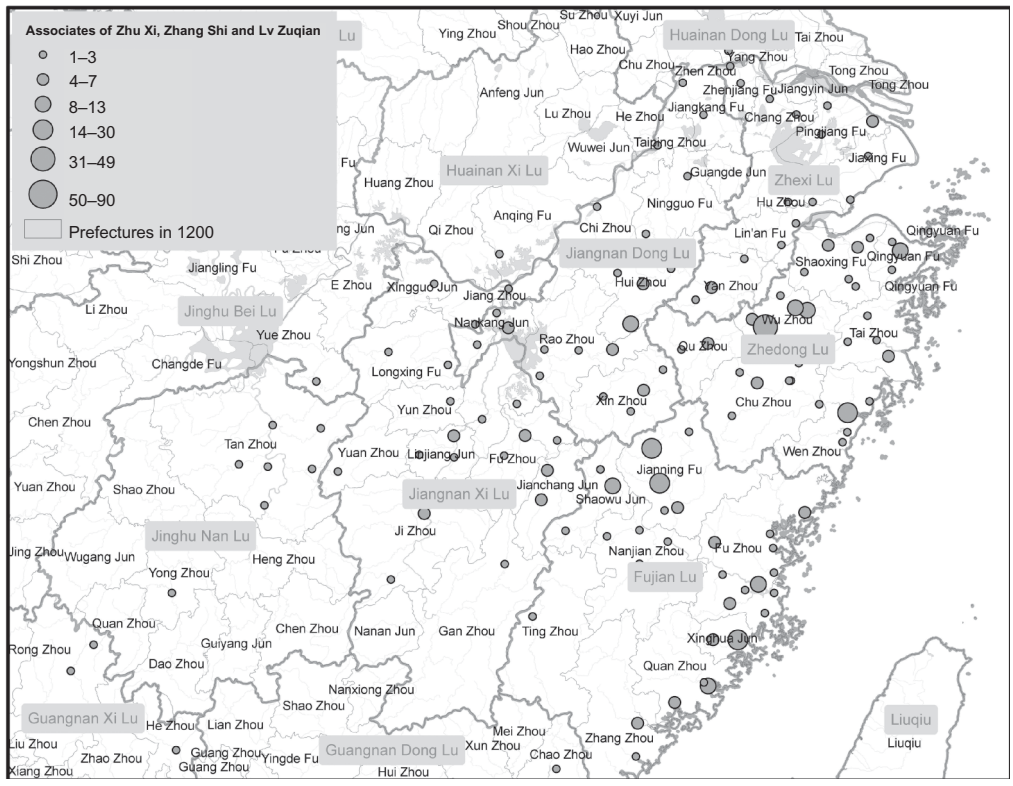

Figure 6. Associates of Zhu, Zhang and Lü in the Southeastern Circuits. Prefectural boundaries from the China Historical GIS v. 5.0.

Lü's associates predominate in Wu zhou, but he also has connections with scholars in the home prefectures of Zhang and Zhu. The reverse is true for Zhang and Zhu as well.

Although in their own lifetimes Zhu and Lü were well-known figures and travelled to court in Linan Fu (Hang zhou), their networks are narrower than what we saw for Wang Anshi and Sima Guang. But even within their own areas, they did not have associates everywhere.

Daoxue, education and commerce

The change in the scope of social networks can be accounted for by drawing on the conclusions of social historians: that as the number of men who regarded themselves as literati and participated in the examination system continued to grow in Southern Song, but the size of government did not, families had ever less hope of placing males in office. At the same time, the number of literati families in a given locale with histories of government service inevitably increased over time. The shift away from the court towards engagement with local society – founding private academies, instituting private welfare organizations, organizing lineages and composing genealogies and producing local histories – encouraged building horizontal relationships. Local fame was a way of being nationally significant.[14] Both Zhu and Lü gathered students from the surrounding area while at home and taught occasionally elsewhere during their careers; this would account for the clustering as shown in Figures 7–9.

But they did not draw uniformly on the surrounding counties and prefectures. One possible explanation is to be found by comparing their networks with the distribution of Southern Song *jinshi* degree holders as shown in Figure 10.

Figure 10 shows that these Daoxue leaders were most successful in making ties in those places that had been higher investments in education and more literati, as indicated by the larger number of examination degrees. This stands to reason, I think, given that Neo-Confucians presented themselves in the first place as teachers of a way of learning that was more true to the sages and better for the individual than the examination-oriented education system they criticized.

But there were some counties and prefectures with very successful records in the examination where they were less successful, both relatively and absolutely. These were the coastal cities of Fujian and Liangzhe and the heart of Jiangnan, from Hang zhou through Hu zhou and Su zhou to the Yangzi. CBDB has 635 unique persons associated with Zhu, Zhang and Lü, 90 of whom cannot be located. But of the remaining 545, only 38 resided in Liangzhe West. Why should this be?

A possible answer emerges when we combine the distribution of associates with the new, and much higher, commercial tax quota promulgated in 1077. Figure 11 shows the result.

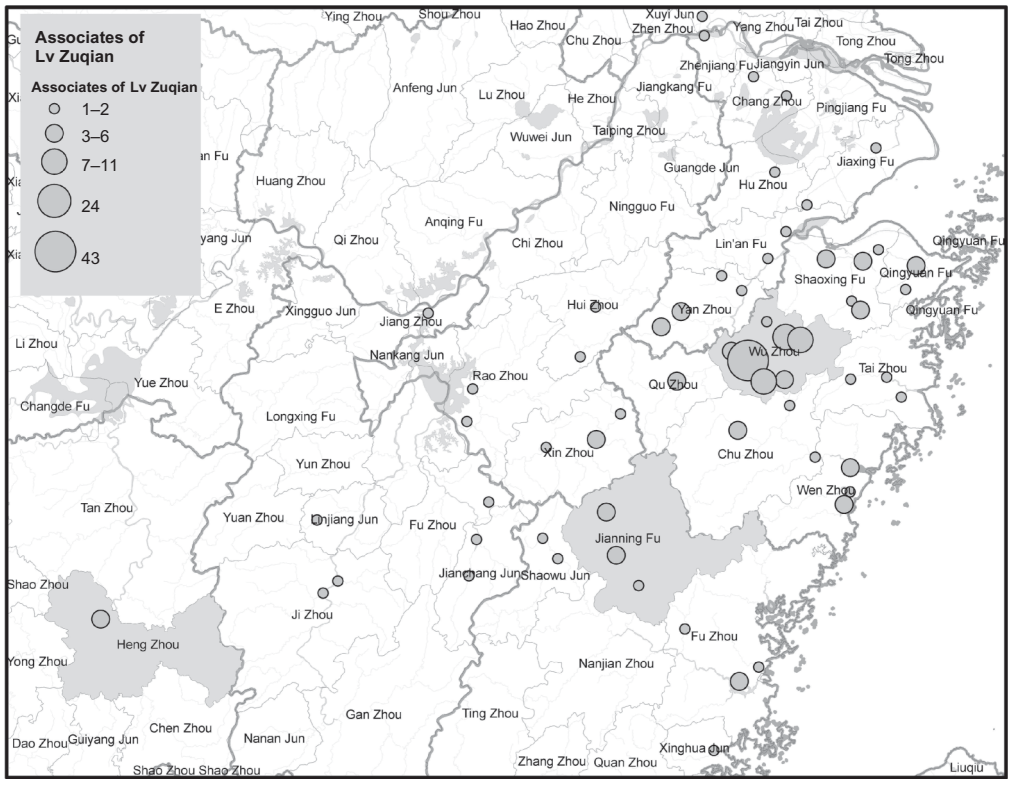

Figure 7. Associates of Lü Zuqian.

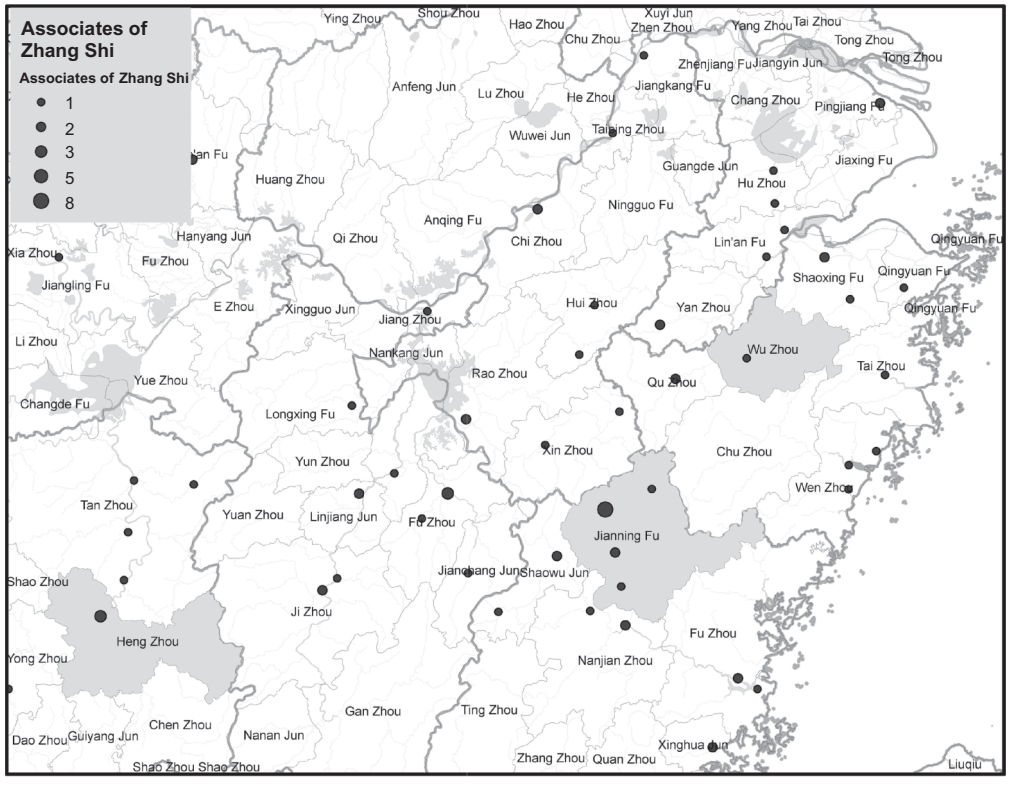

Figure 8. Associates of Zhang Shi.

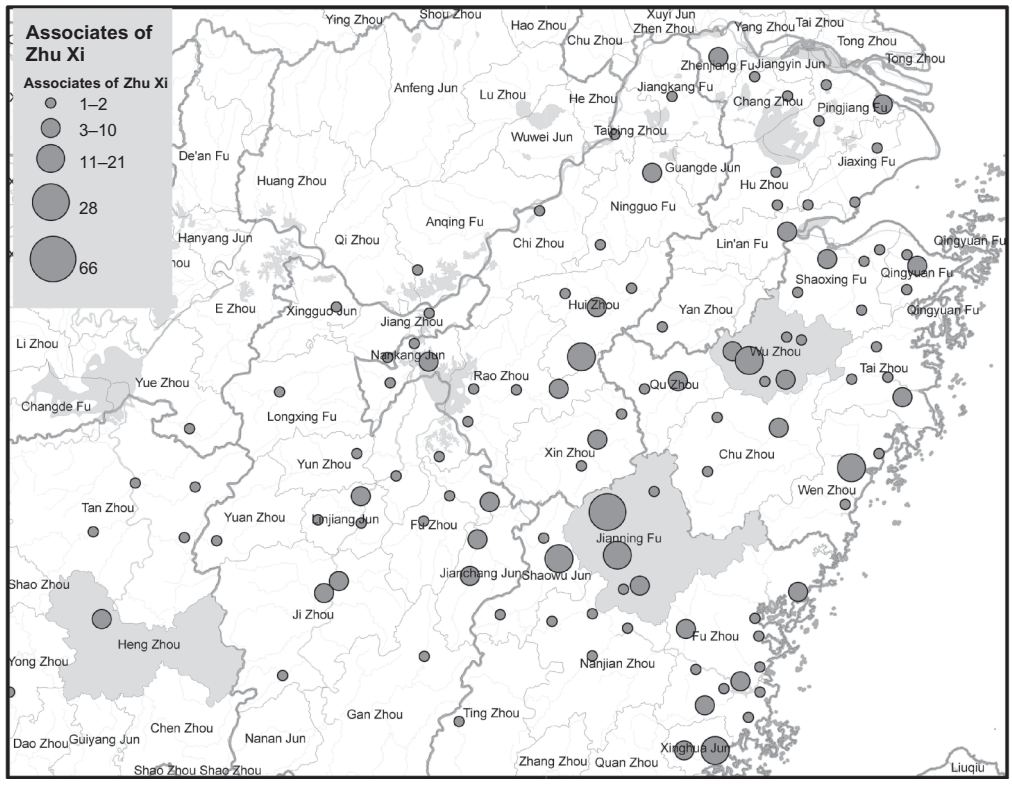

Figure 9. Associates of Zhu Xi.

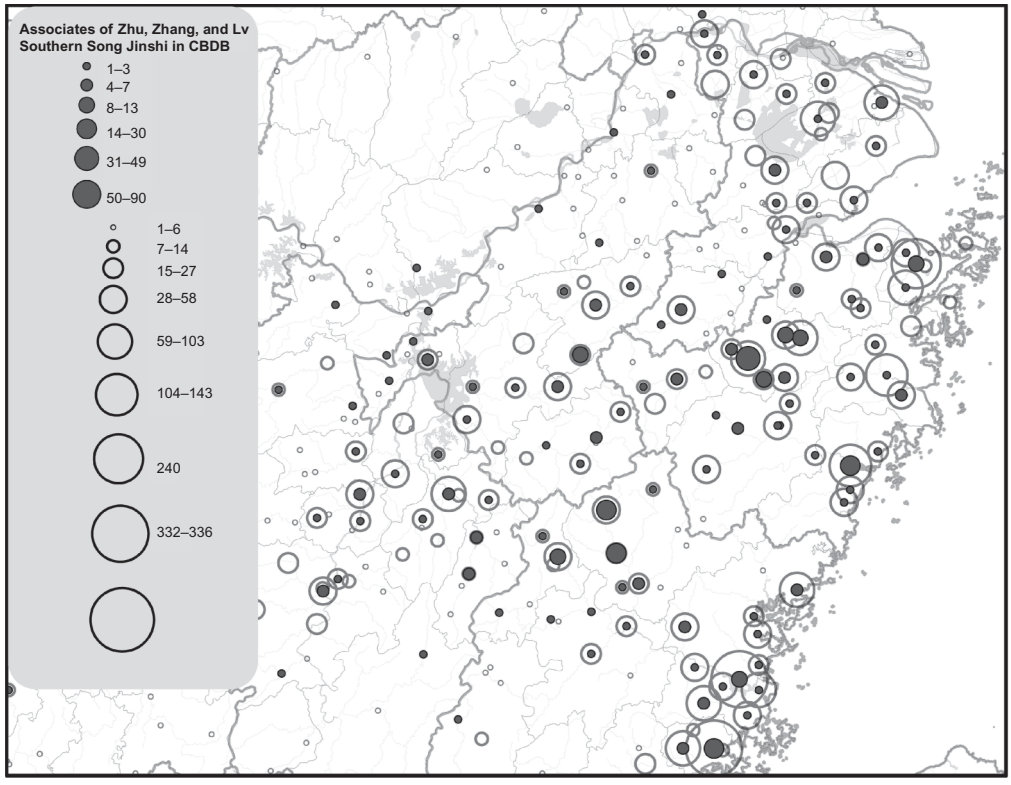

Figure 10. Southern *jinshi* ○ and Associates of Zhu, Zhang and Lü .

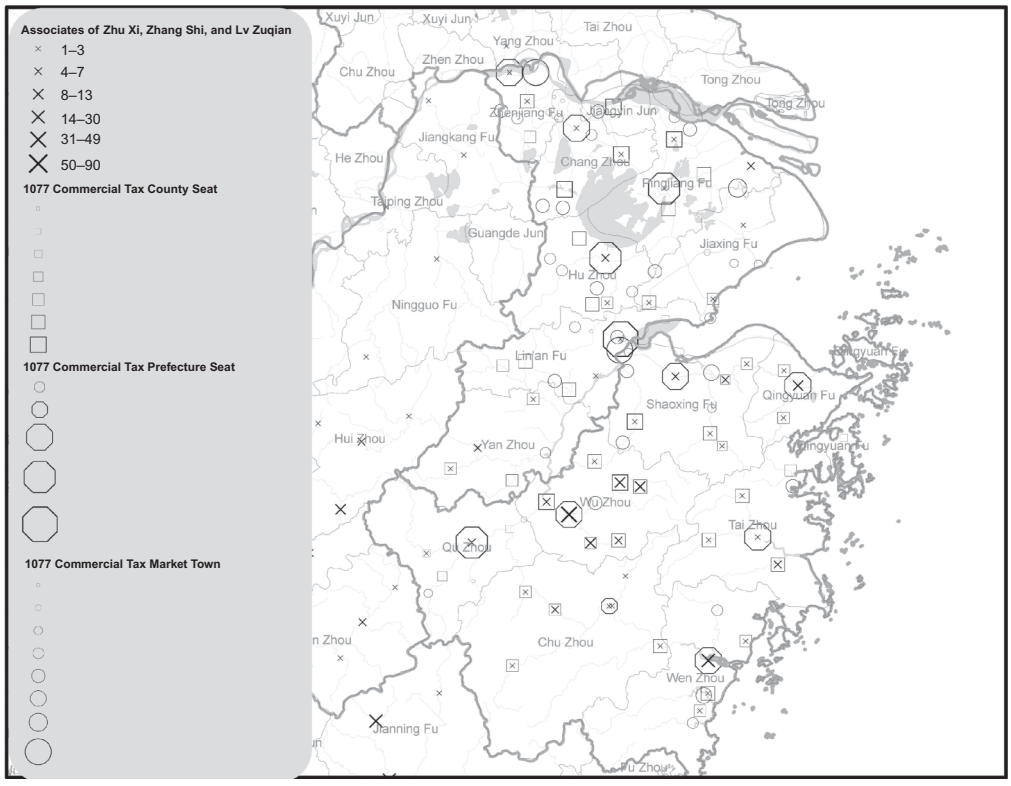

Figure 11. Commercial tax quotas as of 1077 for prefectural and country seats and market towns in Iangzhe East and West and the associates of Zhu, Zhang and Lü. Source for tax data: *Song huiyao jigao*: *shihuo 16–17.*

I take it as given that the commercial development of Jiangnan continued into Southern Song, and that the Hang-Su region was the heartland of commercial activity. This suggests a second conclusion: Neo-Confucians did well in places with higher levels of investment in education but less well in places where wealth was related to the private commercial economy. On reflection, this fits well with what we know about Neo-Confucian socio-economic views. In the Southern Song, they turned away from ideas of land redistribution and state intervention while promoting the idea of literati elite leadership in local society. But they were not interested in the idea, advanced by statecraft thinkers such as Ye Shi 葉適 from the coastal city of Wen zhou that government should invest in infrastructure in support of the commercial economy.[15] They sided with, and drew support from, elite families that depended on the agrarian economy, families that were interested in both the social stability of their locale and in so their own continued (morally responsible) dominance. Lü Zuqian's Wu zhou was on the border of this commercial region. Lü, from a family of émigré officials, was not a local landowner, but he had a marriage alliance with one of them and drew students from well-to-do local families. In contrast, Chen Liang from Yongkang in Wuzhou allied himself with commercially oriented statecraft thinkers.

Conclusion: some implications for historical methodology

Geospatial analysis allows us to see quickly that there are spatial patterns that we might not otherwise think to look for, although if we had we could also have used statistical methods to reach the same conclusion. However, when we use GIS to analyse the prosopographical data that CBDB provides, we can aggregate data without giving up access to information on each individual in the data set. This is not apparent from the maps that are generated using a GIS programme, which freeze a view, combine layers of different kinds of data and are limited in colour and size by the cost and technology of printing. In a GIS programme, the user/reader can add and drop layers, call up the data on individuals that the map has aggregated and change the symbology.

Certainly reaching the audience through online full-colour maps is an improvement over the publication on paper of greyscale versions. Online publication does not, however, offer the capabilities of a GIS programme. For some readers, a solution will be to provide the GIS files as part of an online publication, although given my experience in using GIS in teaching I am not confident that the audiences we wish to reach will acquire this skill. An alternative is to make a scholarly investment in the use of

online mapping platforms as the vehicle for the dissemination of research. At Harvard, we have been developing one such platform, WorldMap™, built on open-source programming, which allows users to upload all the layers necessary for their own maps, create stabile views or allow users to make changes, control access to their work and share it with others. Its 'ChinaMap' is an example of what is possible at the moment.[16] Ultimately, the use of geospatial analysis in historical studies will grow as we learn how to share the data sets that we build as part of our research. The China Historical GIS project, on which Harvard and the Center for Chinese Historical Geography at Fudan have collaborated since 2001, through its time series of the administrative structure from 221 BC to 1911, provides the fundamental GIS necessary for the spatial analysis of historical data.[17] The challenge is to create sustainable links online between the dissemination of research narratives, the data we use in that research and the analytic and visualization tools that we employ in our research.

Notes

1. Huang Zongxi (1986, 2008), Wang Zicai (1937).
2. Wang Deyi (2005). The analysis was based on a text-mining procedure in which the co-occurrences of the 25,000 names of the biographical subjects were mined in all the 25,000 biographies. This missed those people who do not have biographies in this data set but none of them would rival the numbers of the leading figures.
3. Chen Rongjie (1982).
4. Wilson (1995).
5. He Yousen (1955).
6. Yang Yuan (1982).
7. A description and history of the project will be found at the CBDB website, http://isites.harvard.edu/icb/icb.do?keyword=k16229.
8. Bol (2011) Peking University Center for Research on Ancient Chinese History, Harvard University Fairbank Center for Chinese Studies, Academia Sinica Institute of History and Philology, Peking University Center for Research on Ancient Chinese History, http://59.124.34.70/cbdbc/ttsweb?@0:0:1:cbdbkm@@0.10566209097417267. The version used in this study is 20110624CBDBw.mdb, available for download at the CBDB website.
9. Wang Deyi (2005).
10. Li Zhiliang (2001a, 2001b, 2001c, 2001d, 2001f, 2001g, 2001h, 2001i) Wang Deyi (2005).
11. For a more extensive account of the CBDB structure and query capabilities see Fuller (2011). available from the CBDB website.
12. Chaffee (1985).
13. For a brief discussion of the historical network analysis see Wetherhall (1998). Important examples of historical network analysis, both of which offer insights for Chinese history are Padgett's account of how Cosmo d'Medici provided the link between distinct groups, see Padgett and Ansell (1993), and Bearman (1993).
14. Hymes (1986), Bossler (1998), Chaffee (1985), Hartwell (1982), Bol (2003, 2008, 1990), Chen Wenyi (2007).
15. Bol (2002), Ye Shi (1961), Zhou Mengjiang (2005).
16. http://worldmap.harvard.edu/ 'WorldMap is an experimental platform designed for viewing and interpreting maps collaboratively. Today maps come from many sources and take many forms, from paper atlases to digital satellite images to census files. WorldMap aims to pull these and other hard-to-find maps together and make them available to researchers to explore, share, annotate and remix. WorldMap combines modelling capabilities of Geographic Information System (GIS) with current web technologies and is made available as Open Source software. Use the hosted version of WorldMap here or download and run the application on your own server. WorldMap stands on the shoulders of other Open Source projects including AfricaMap, GeoNode, OpenLayers, PostGIS and GEOS. WorldMap is licensed under Version 3 of the GNU General Public License (GPL).
17. To consult the online gazetteer or download the CHGIS GIS files go to http://www.fas.harvard.edu/~chgis/. 'The main task of the CHGIS relational database is to create unique records for all of the administrative units down to the county (xian) level that were part of the historical dynasties of China from the time of unification (222 BCE) to the end of the dynastic period (1911 CE), and to provide documentation of the sources used to create each record. At the same time, records will be created for the various states and confederations independent of those empires, referred to as "Regimes." The purpose is to create a basic database to contain all the aforementioned administrative units that can be queried and linked to digital geographic objects. In addition, settlements below the county seat level are included for some areas and periods. Settlement data will be further expanded once the basic administrative structure is established. Queries to the database must allow users to select out the valid administrative units for any date covered by the database, or to find particular historical places by name and by feature type. Each administrative unit record in the database will also define its relationship to the hierarchical organization of the territory of the Dynasty or Regime. For example, a related table will show that a particular prefecture record was part of a particular province for a specific period of time. The hierarchical relationships can be queried repetitively to determine the administrative parent jurisdiction or subordinate jurisdictions, from the Dynasty level down to the county level. In addition to working directly within the relational database, the users must be able to link each record to a geographic object in GIS. In other words, for a particular prefecture record, the user must be able to find a spatial object to represent the prefecture as a digital map. For prefectures, provinces, regimes and dynasties, CHGIS will digitize both polygons (to represent the area of jurisdiction) and points (to represent the location of the administrative seat). Counties and all other settlement types below the county will be digitized as point features'.

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