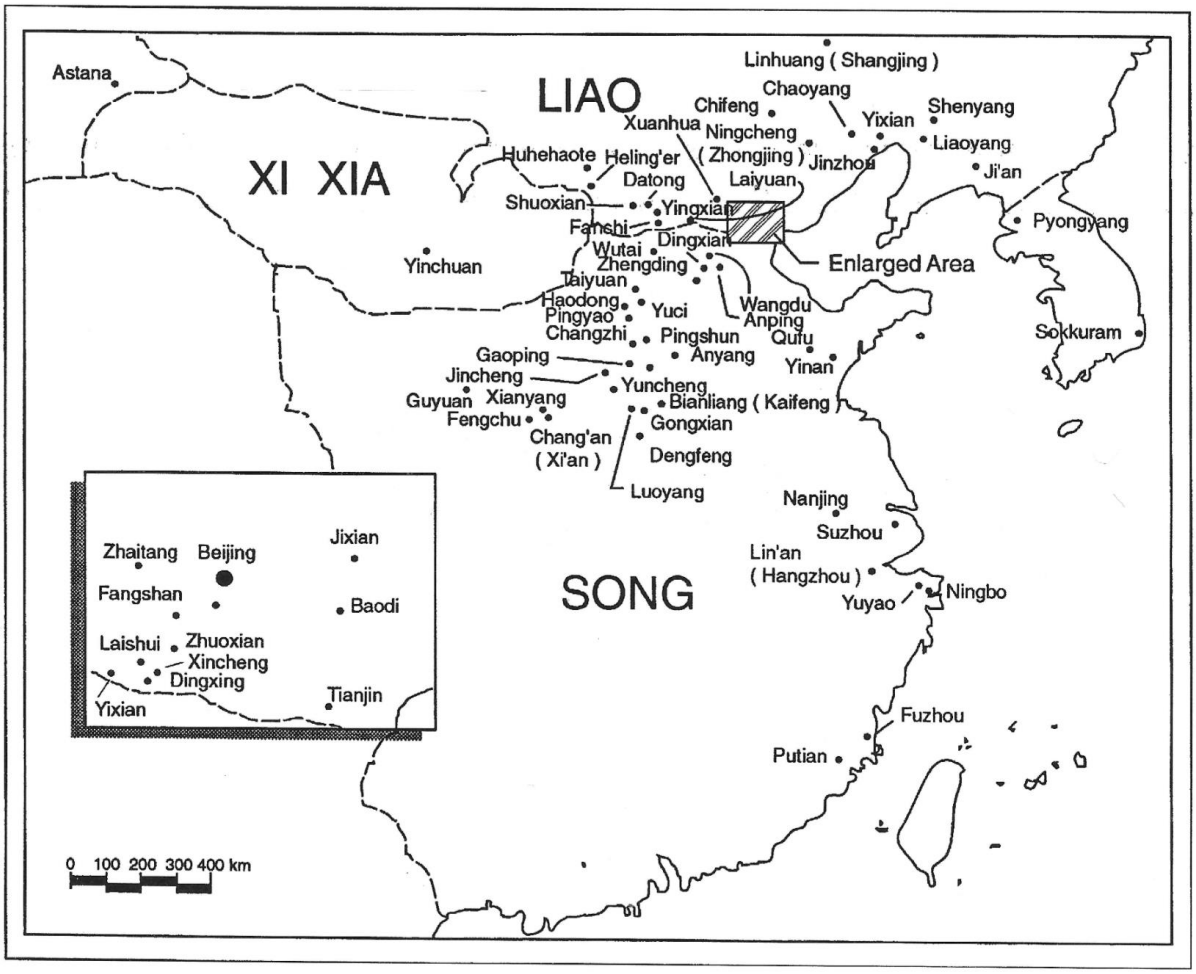
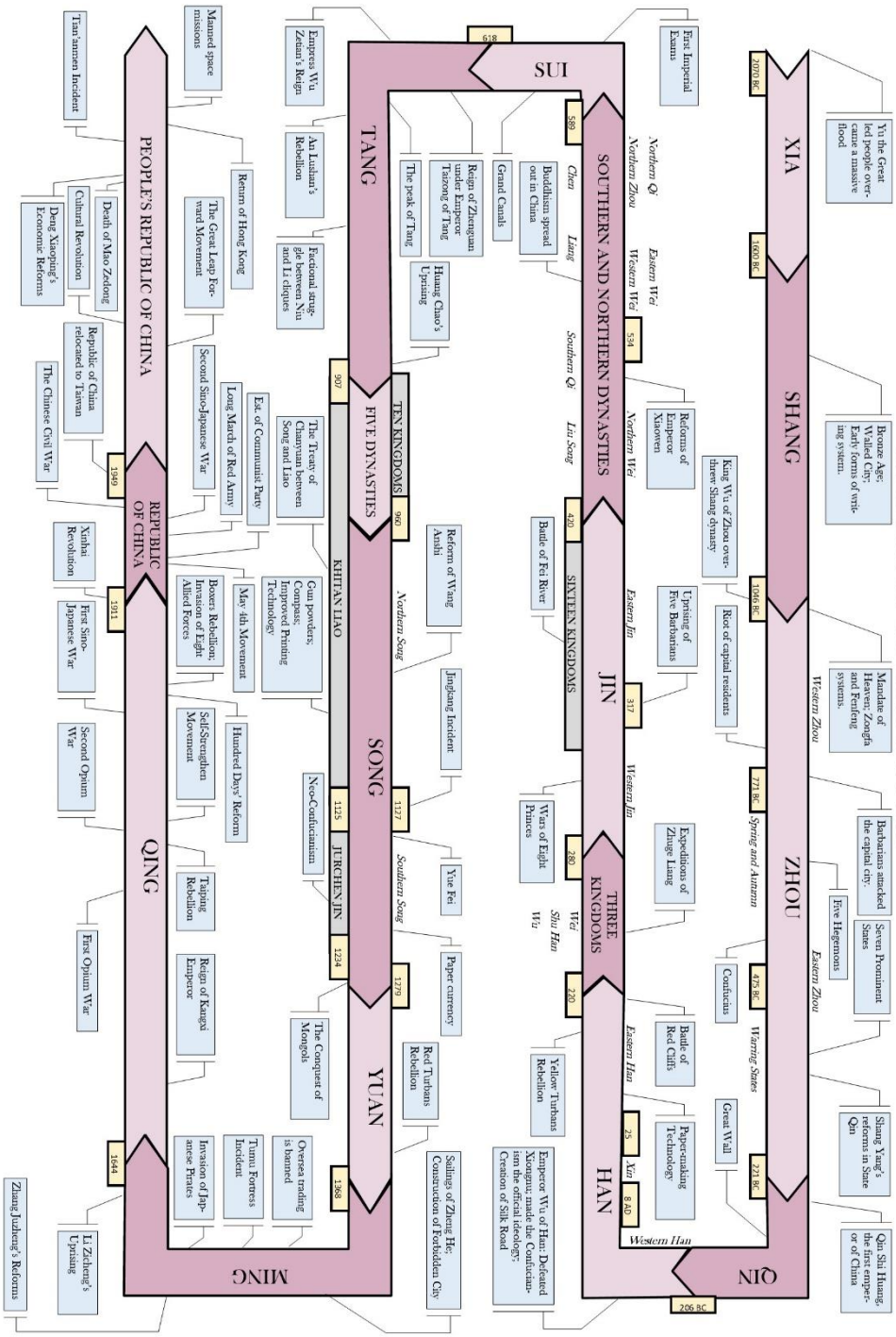
**List of Figures:**

Fig. 1.1:




Map of the major sites of the Liao, Song and Xixia polities (after Steinhardt 1997:2).

Fig. 1.2 (landscape):




Timeline of Chinese history (after

https://commons.wikimedia.org/wiki/File:Timelin

e_of_Chinese_History.jpg (accessed 05/10/2018)

Fig. 1.3:

| ELEMENTS | CREATES | CONQUERS | COLOR |
|---|---|---|---|
| Earth | Metal | Water | Yellow |
| Metal | Water | Wood | White |
| Water | Wood | Fire | Black |
| Wood | Fire | Earth | Blue |
| Fire | Earth | Metal | Red |

Table of the ‘Five Elements’ (after Chen 2014:327).

Fig. 1.4:

| 1. | 2. | 3. |
|---|---|---|
| Tang (618-907) | Tang (618-907) | Tang (618-907) |
| Liao (907-1125) | Five Dynasties (907-960) | Five Dynasties (907-960) |
| Jin (1115-1234) | Song (960-1279) | Song (960-1279) |
| Yuan (1271-1368) | Yuan (1271-1368) | Jin (1115-1234) |
| | | Yuan (1271-1368) |

The three main options for a linear dynastic succession available to the Yuan compilers of the *Liaoshi*.

Fig. 1.5:

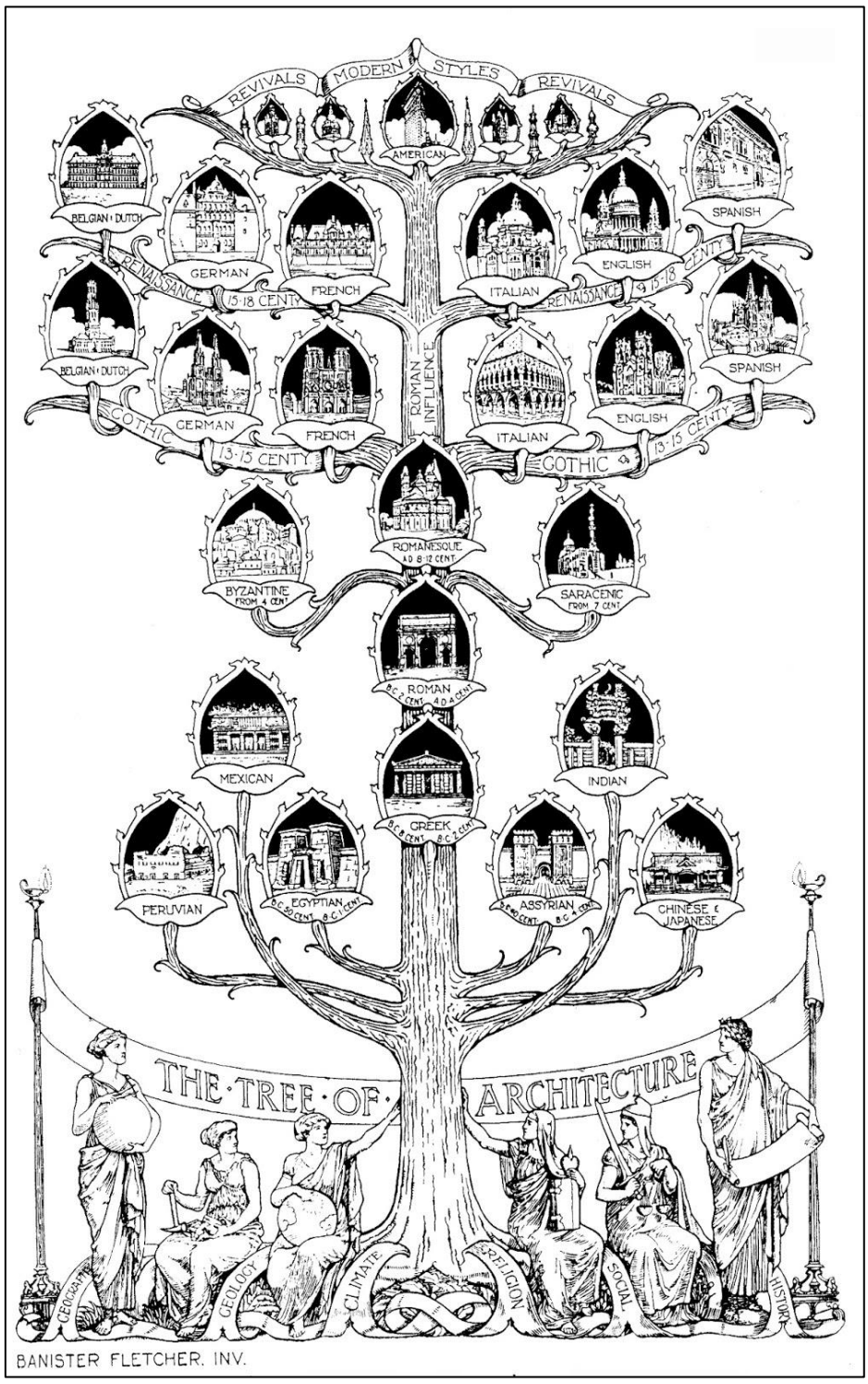
Liao and Jin pagodas at Zhongjing. rising above the local architecture (Dugdale 2015).

Fig. 2.1:


Yingxian Timber Pagoda

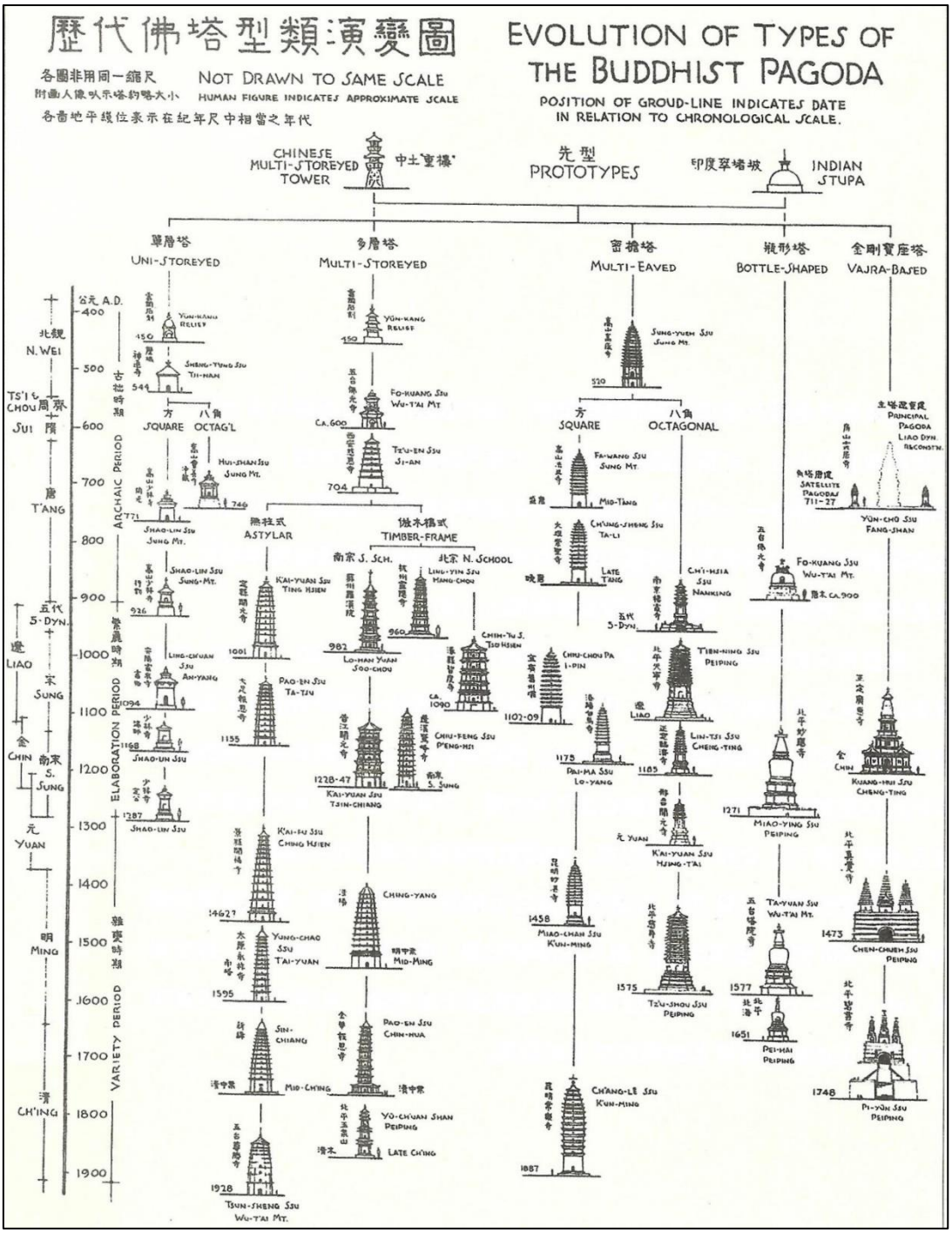
(Dugdale 2015).

Fig. 2.2:




The Tree of Architecture (after Fletcher 1996:cover page).

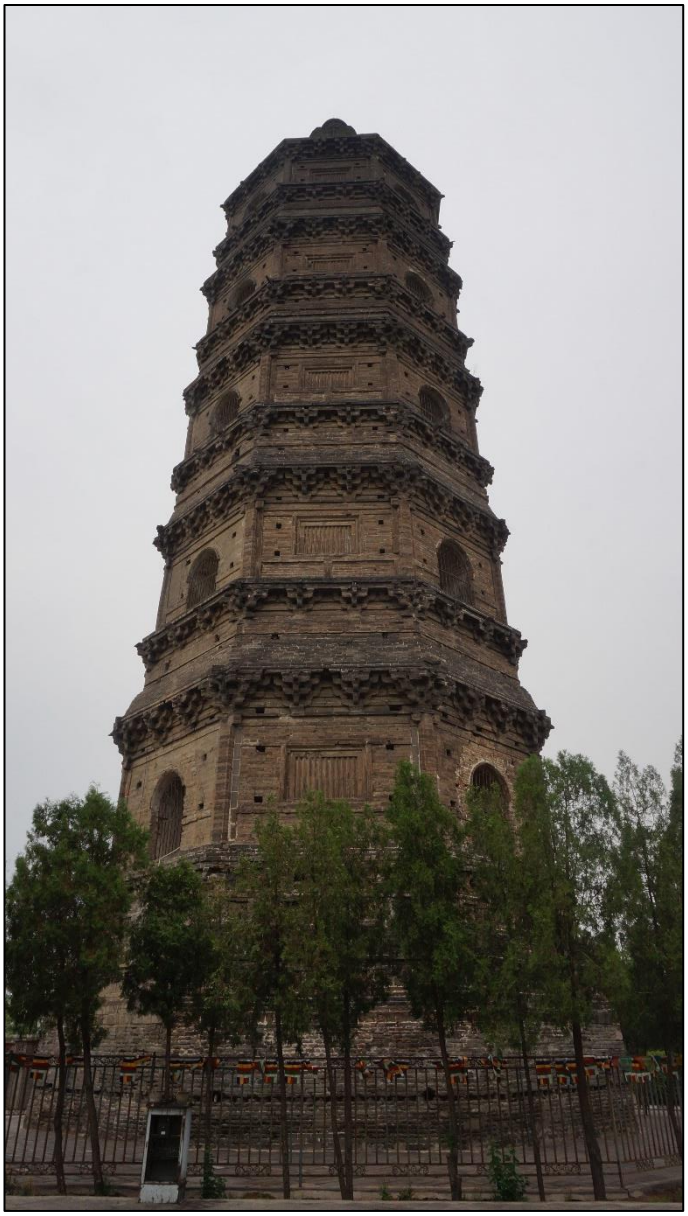
Fig. 2.3:




Typology of pagodas in China (after:

Liang Sicheng 2011:116).

Fig. 2.4:

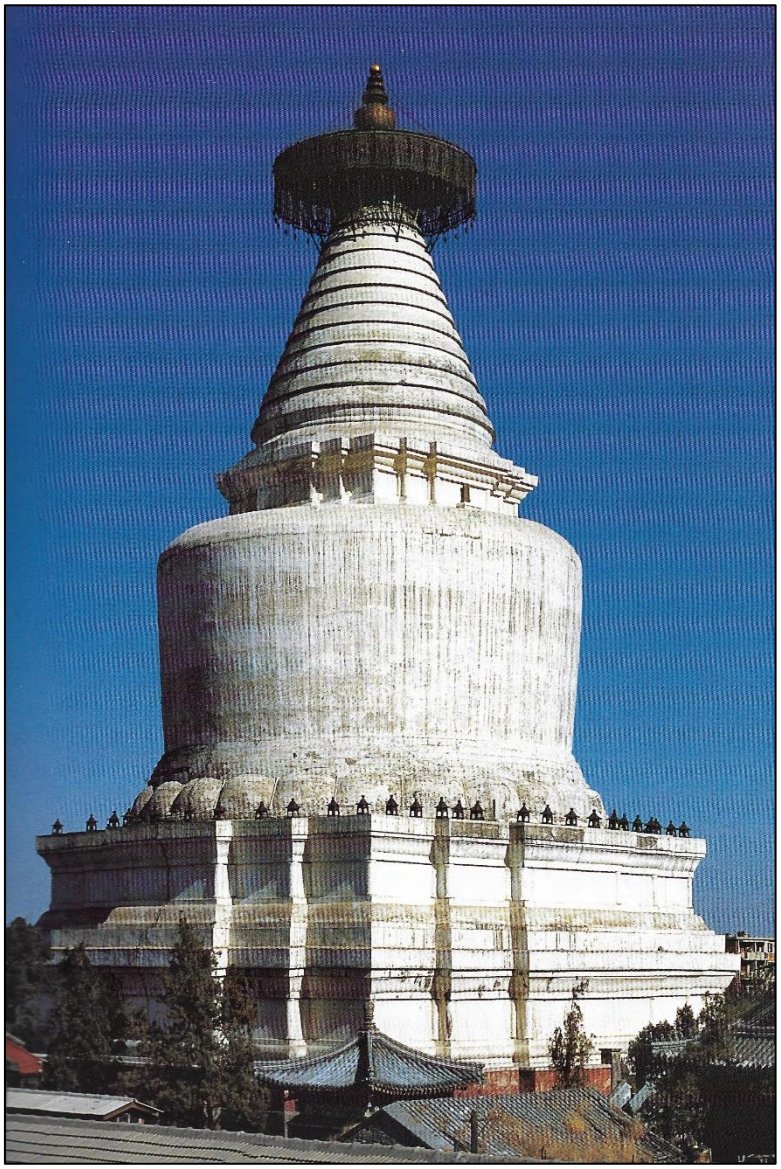


Example of a *louge* pagoda – the Liangxiang Pagoda (Dugdale 2015).

Fig. 2.5:

Example of a *miyan* pagoda – the Tianningsi Pagoda (Dugdale 2015).

Fig. 2.6:

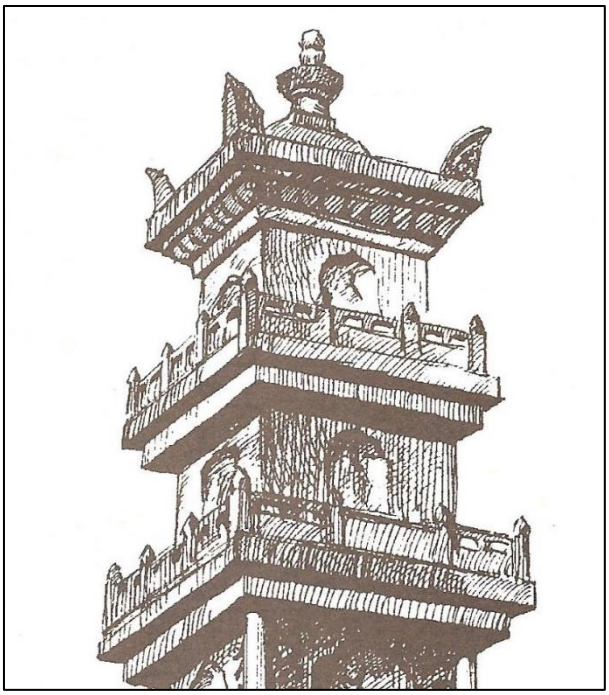


Example of a *lama* Pagoda – The Miaoyingsi White Pagoda (after: Steinhardt 2002:239).

Fig. 2.7:

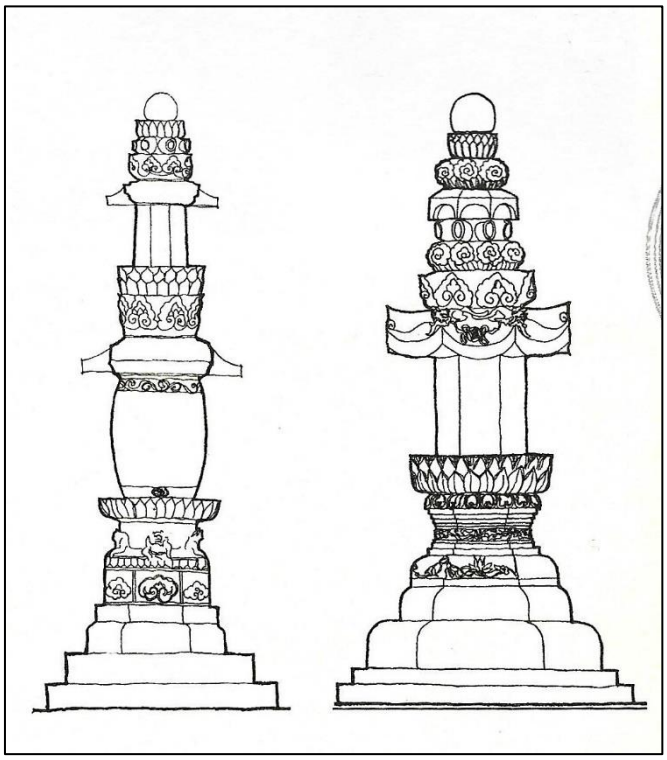
Example of a *hua* pagoda – The Qinghuasi Flower Pagoda (Dugdale 2015).

Fig. 2.8:



Example illustration of a *baoqie* pagoda (after Xu 2007:172).

Fig. 2.9:



Different variations of *chuang* style pagodas (after Zhang Yuhuan 2011:93).

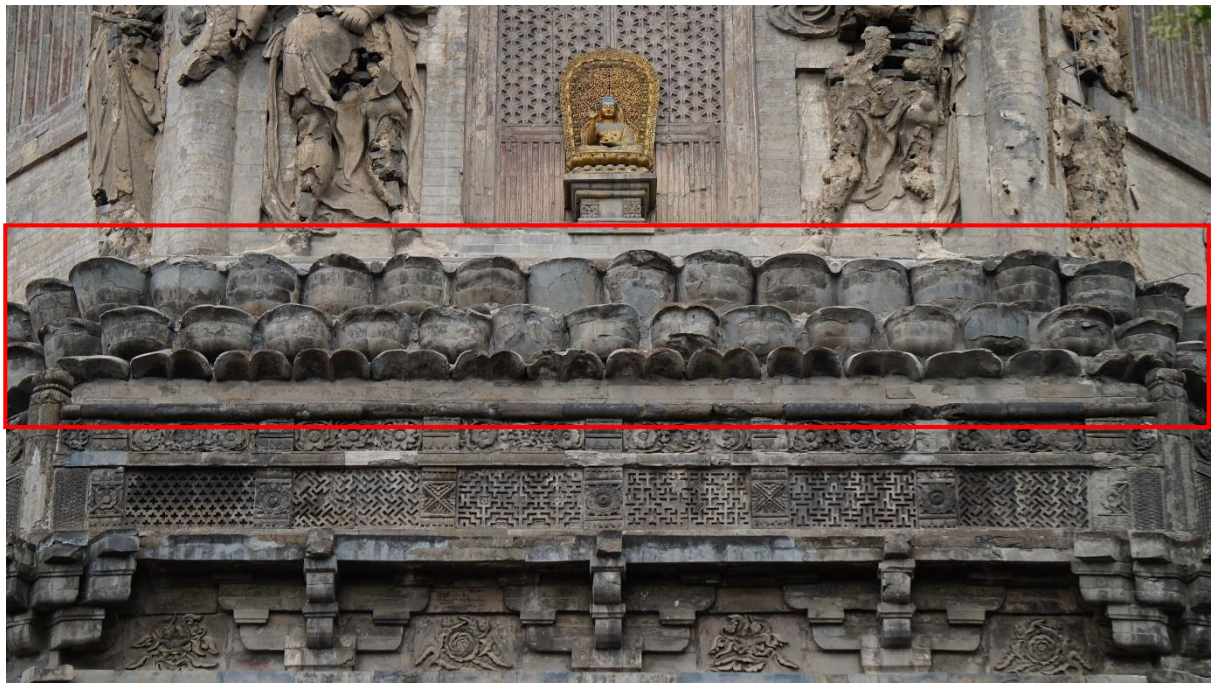
Fig. 2.10:

Qingzhou White Pagoda with double eaves highlighted (Dugdale 2015).

Fig. 2.11:

Examples of both timber (left) and brick imitation (right) *dougong* bracket sets (Dugdale 2015).

Fig. 2.12:



Lotus base design highlighted in red –

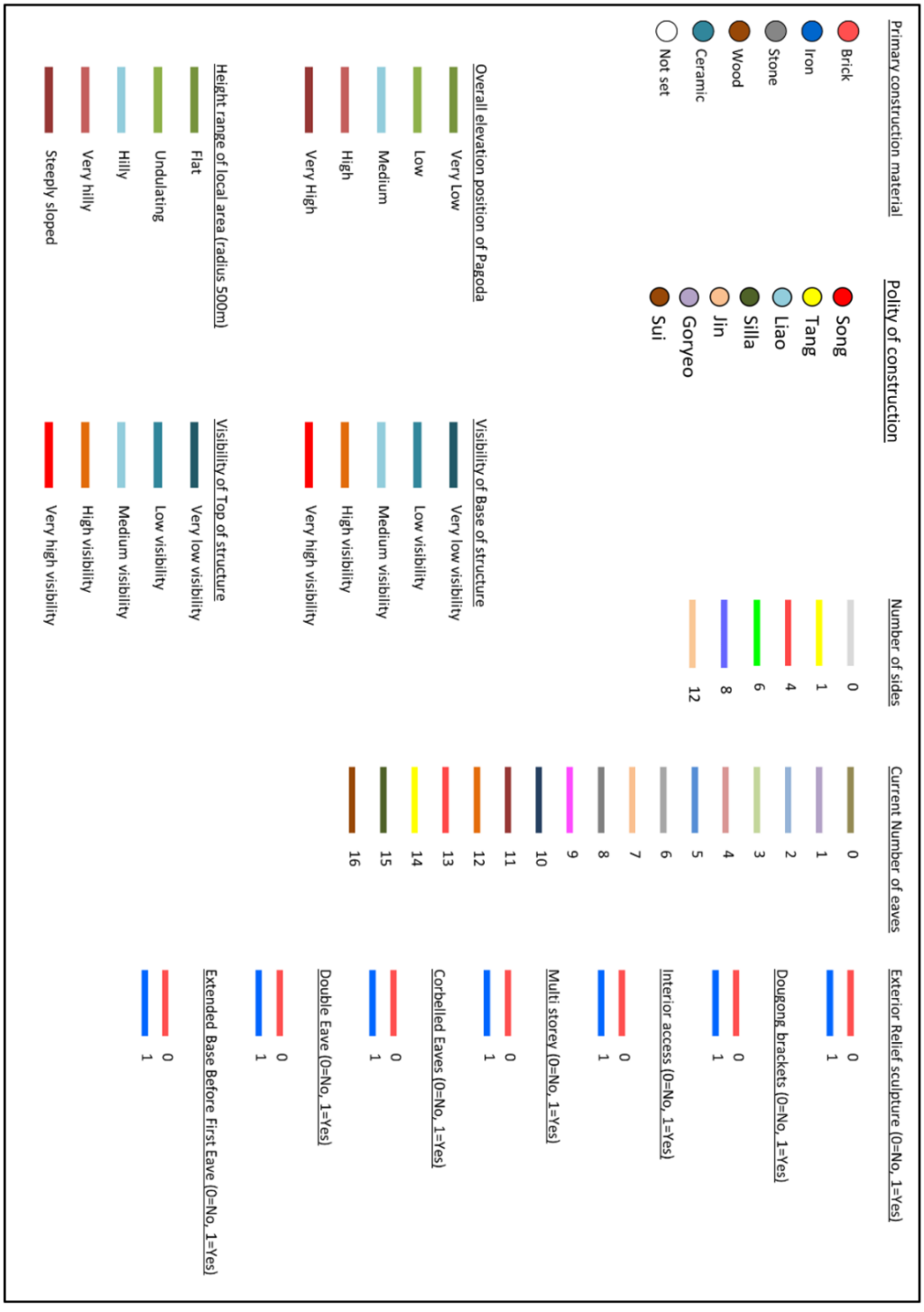
Tianningsi Pagoda (Dugdale 2015).

Fig. 2.13:


Base map used for the HEAP Database

(Google, ZENRIN 2017).

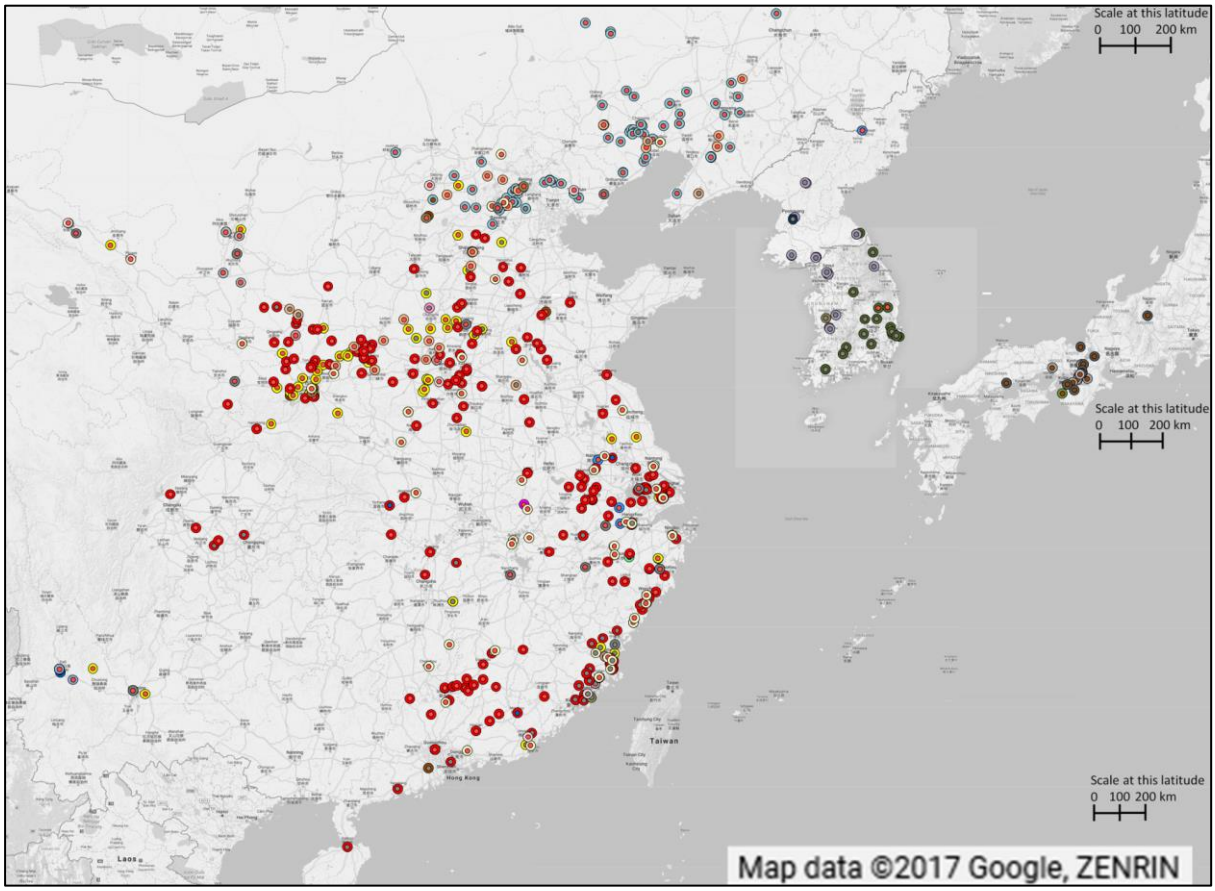
Fig. 2.14:




Colour key for commonly used values in visualisations.

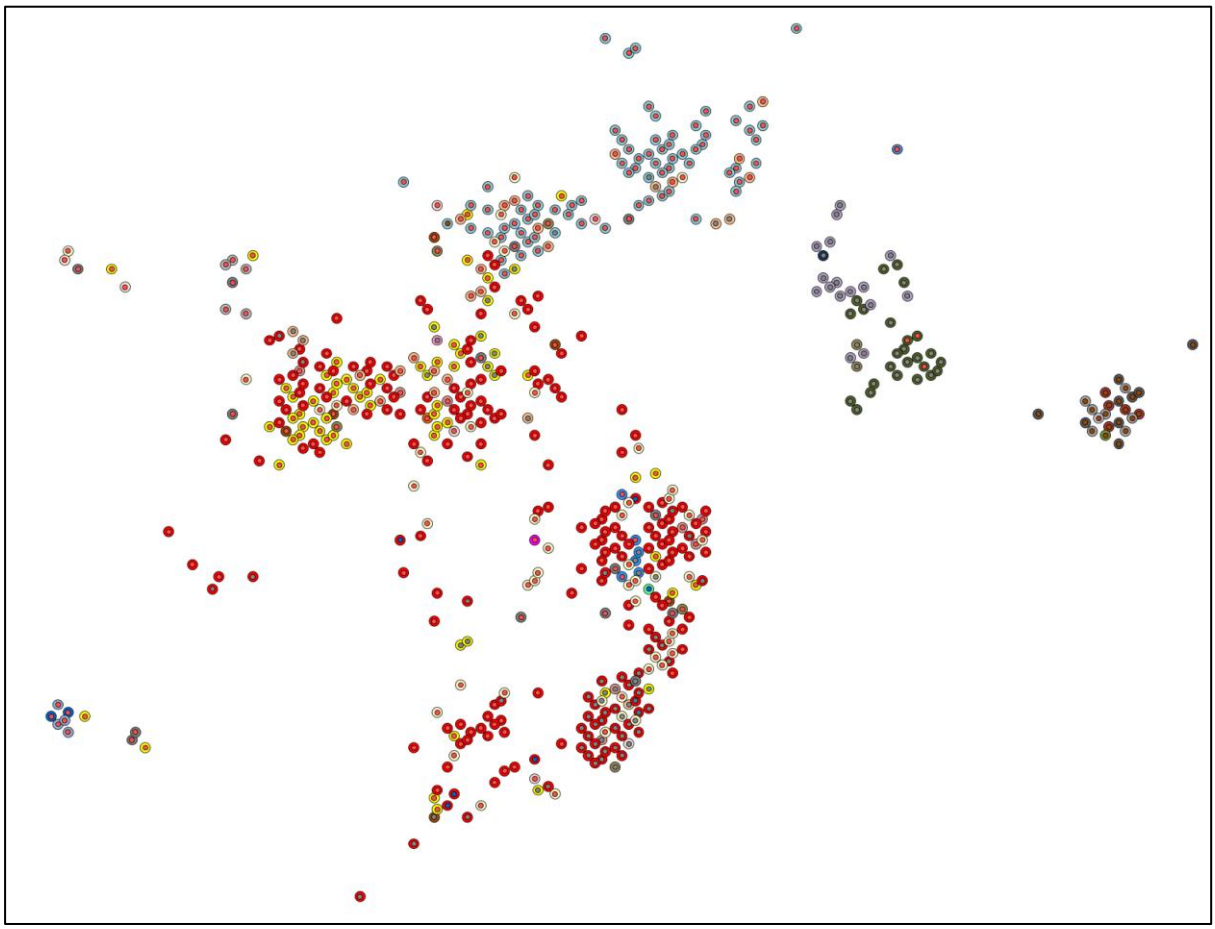
produced by the HEAP Database.

Fig. 2.15:



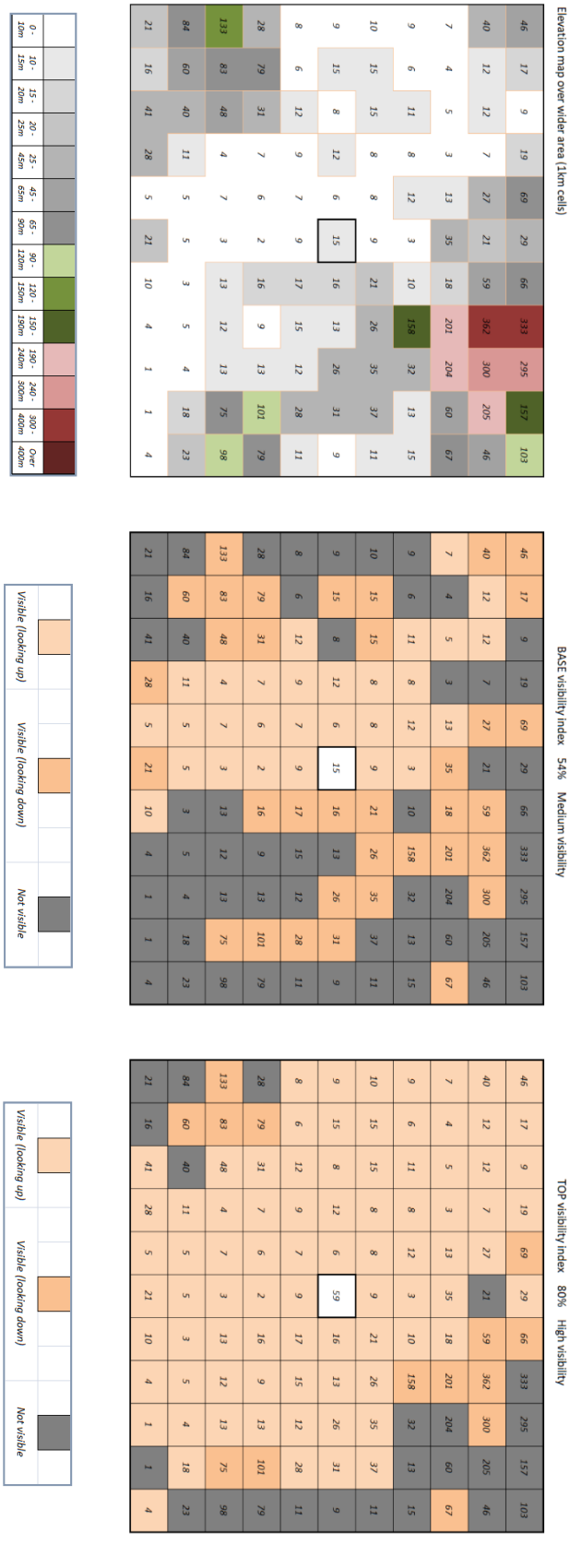

Example map displaying all pagodas in HEAP Database.

Fig. 2.16:



Example map demonstrating the ‘de-clutter’ offset.

Fig. 2.17 (landscape):



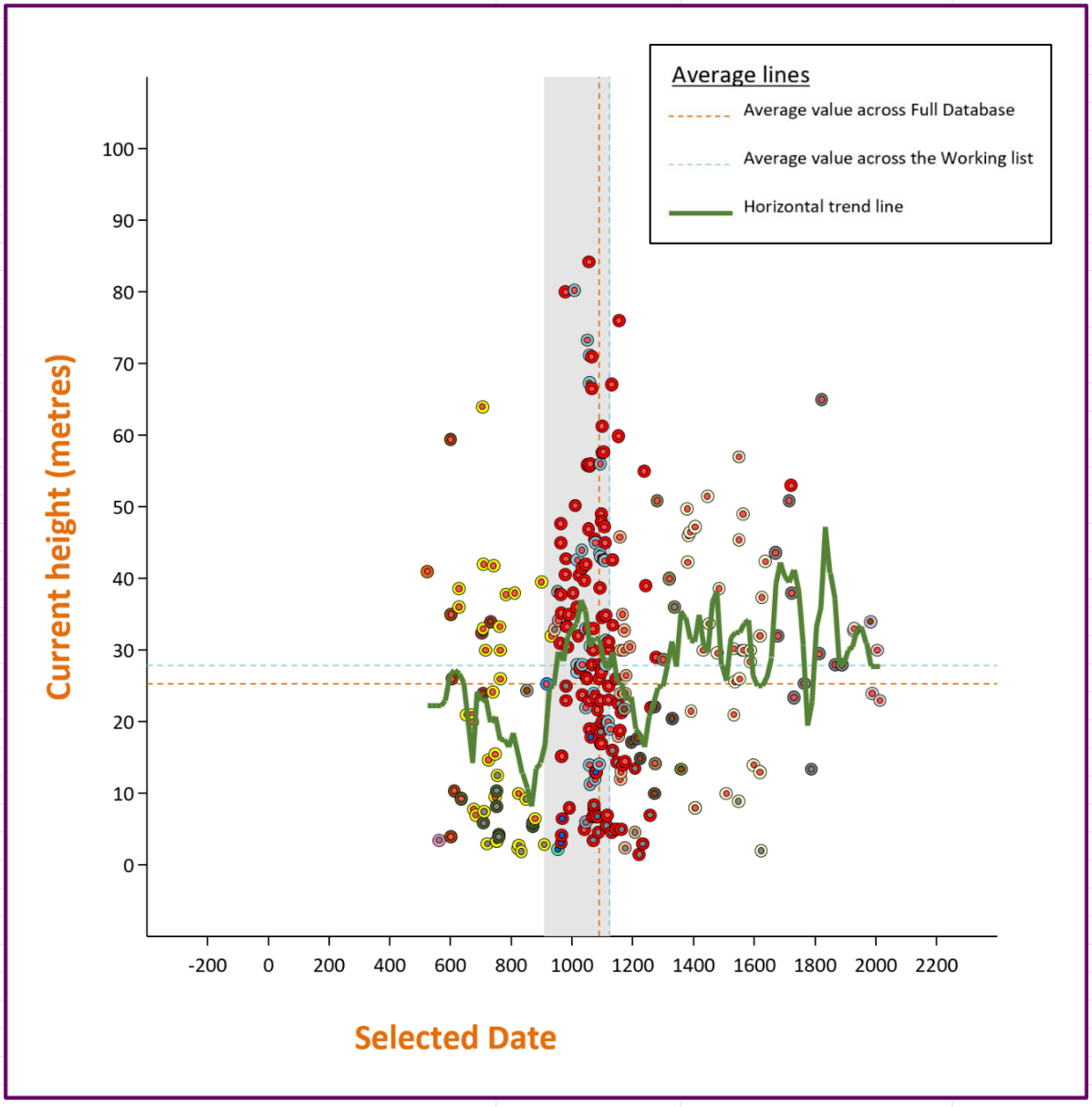

Example ‘elevation’ and ‘visibility’ maps.

| | | * Current height (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Min | Max | Ave | Less than 11 | 11 to 21 | 21 to 31 | 31 to 41 | 41 to 51 | 51 to 61 | 61 to 71 | More than 71 | |
| | Tot | 1.0 | 84.2 | 25.3 | 123 | 113 | 138 | 96 | 56 | 17 | 9 | 7 | 0 |
| * Primary construction material | | | | | | | | | | | | | |
| Brick | 404 | 4.0 | 84.2 | 30.4 | 24 | 81 | 126 | 89 | 52 | 17 | 8 | 7 | |
| Iron | 6 | 2.2 | 17.9 | 7.8 | 4 | 2 | | | | | | | |
| Stone | 123 | 1.0 | 48.2 | 10.1 | 90 | 19 | 7 | 3 | 4 | | | | |
| Wood | 24 | 4.0 | 67.3 | 22.2 | 3 | 11 | 5 | 4 | | | 1 | | |
| Ceramic | 2 | 6.8 | 6.8 | 6.8 | 2 | | | | | | | | |

Example output from the statistics worksheet comparing ‘primary construction material’ with ‘height’.

Fig. 2.18 (landscape):

Fig. 2.19:



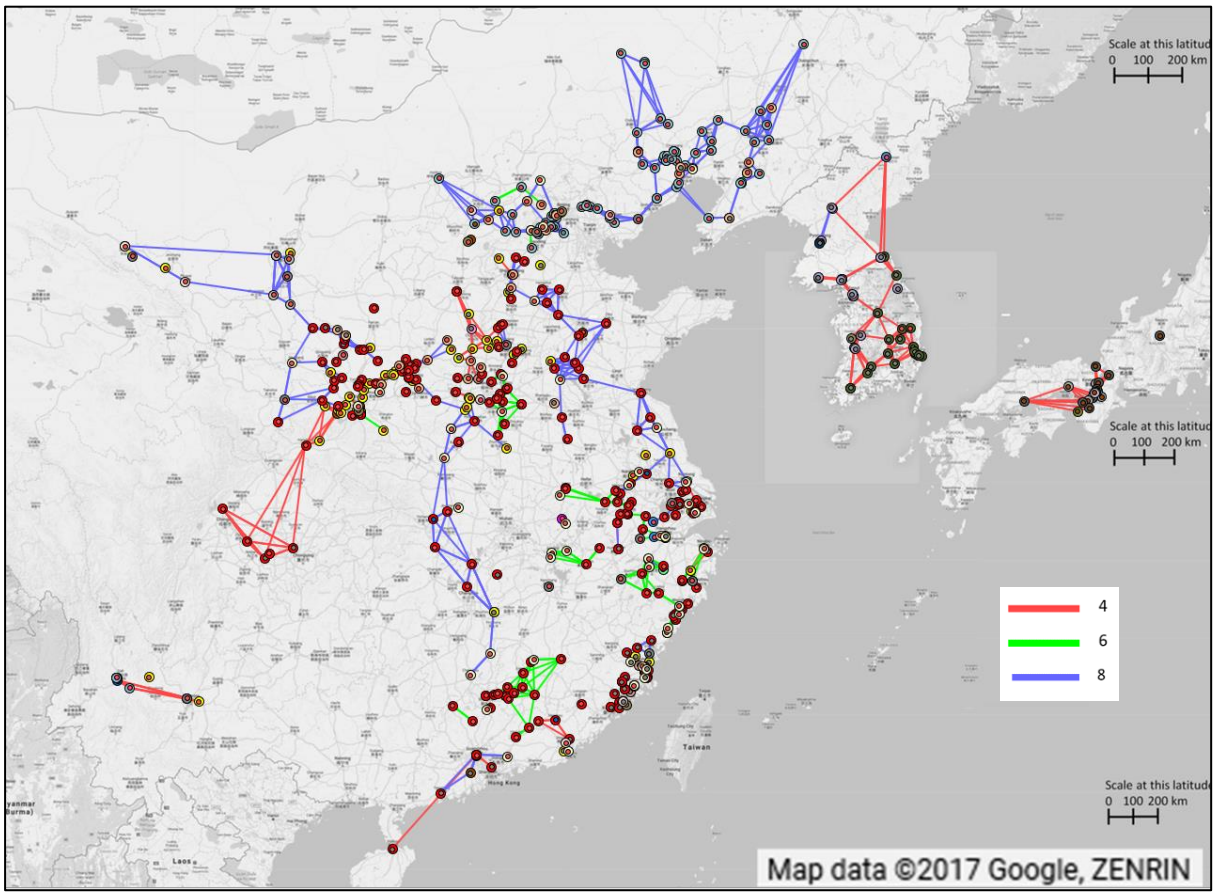

Example scatter chart displaying 'height' against 'date of construction' with average lines, trend line and Liao dynastic period highlighted.

Fig. 2.20:

| Pagoda characteristic | Average across all Pagodas | Average across Pagodas in the current Working list | Difference (Numerical and as a percentage) | |
|---|---|---|---|---|
| Number of sides | 6.2 | 5.8 | -0.5 | -7% |
| Current Number of eaves | 7.2 | 5.4 | -1.8 | -25% |
| Current height (metres) | 25.3 | 10.1 | -15.2 | -60% |
| Exterior Relief sculpture (0=No, 1=Yes) | 37% | 57% | 20% | 20% |
| Dougong brackets (0=No, 1=Yes) | 57% | 17% | -40% | -40% |
| Interior access (0=No, 1=Yes) | 55% | 18% | -37% | -37% |
| Multi storey (0=No, 1=Yes) | 44% | 16% | -28% | -28% |
| Corbelled Eaves (0=No, 1=Yes) | 55% | 36% | -20% | -20% |
| Dense Eaves (0=No, 1=Yes) | 23% | 12% | -10% | -10% |
| Double Eave (0=No, 1=Yes) | 26% | 10% | -16% | -16% |
| Miniaturised (0=No, 1=Yes) | 18% | 68% | 50% | 50% |
| Stupa style top (0=No, 1=Yes) | 5% | 4% | -1% | -1% |
| Lotus base (0=No, 1=Yes) | 15% | 12% | -3% | -3% |
| Extended Base Before First Eave (0=No, 1=Yes) | 64% | 76% | 13% | 13% |
| Additional base incorporated (0=No, 1=Yes) | 51% | 82% | 31% | 31% |
| Pagoda elevation (metres above sea level) | 333 | 234 | -98.1 | -30% |
| Elevation directions for 100m | 4.5 | 3.9 | -0.5 | -12% |
| Elevation directions for 200m | 3.7 | 3.2 | -0.6 | -16% |
| Elevation directions for 300m | 3.3 | 2.7 | -0.6 | -18% |
| Elevation directions for 400m | 3.0 | 2.4 | -0.7 | -22% |
| Elevation directions for 500m | 2.8 | 2.2 | -0.7 | -23% |
| Summary of overall base elevation | 3.5 | 2.9 | -0.6 | -17% |
| Base visibility index | 43% | 35% | -8% | -8% |
| Top visibility index | 62% | 42% | -20% | -20% |

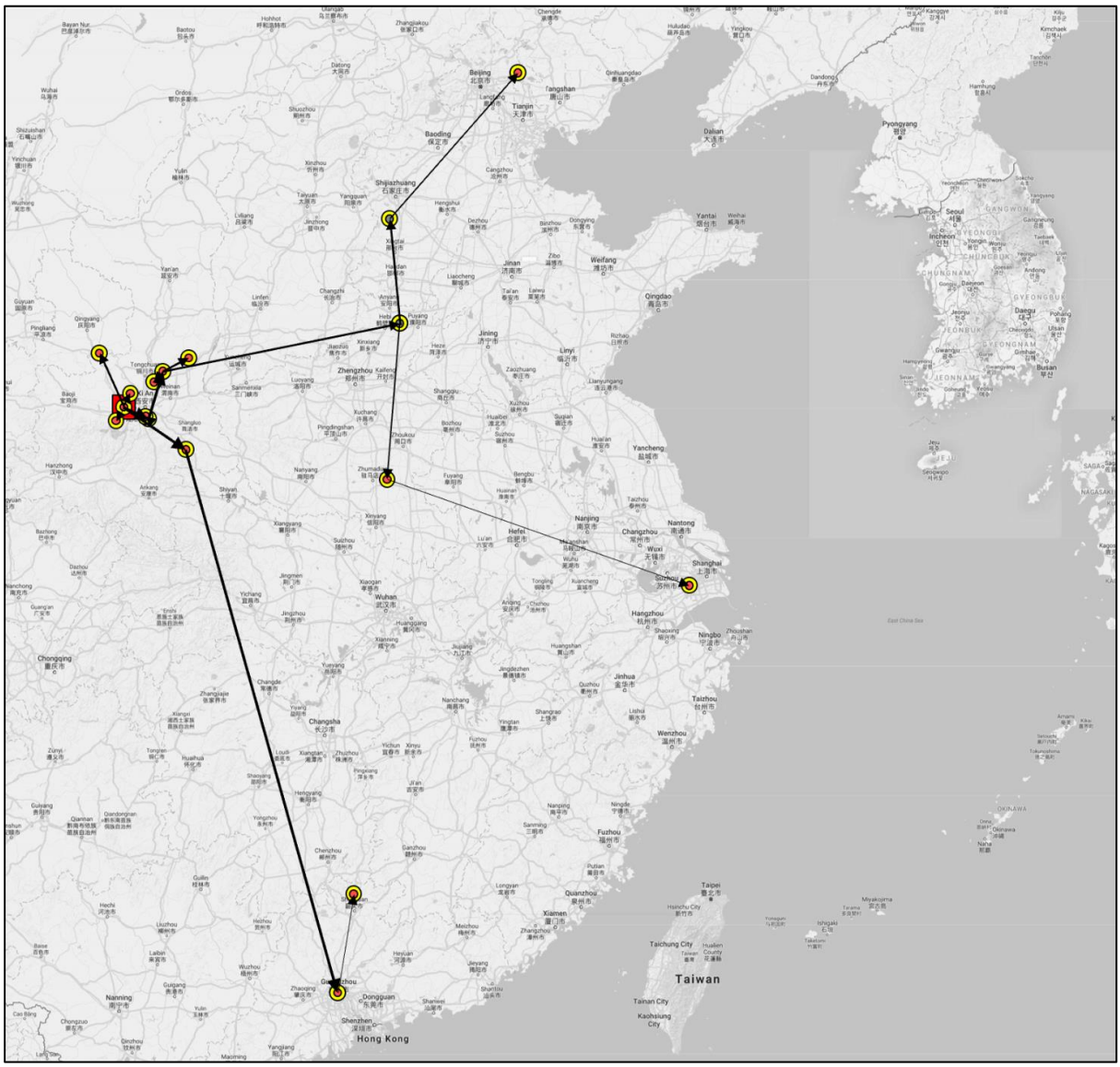
Example ‘comparison table’ based on a working list of only stone pagodas.

Fig. 2.21:



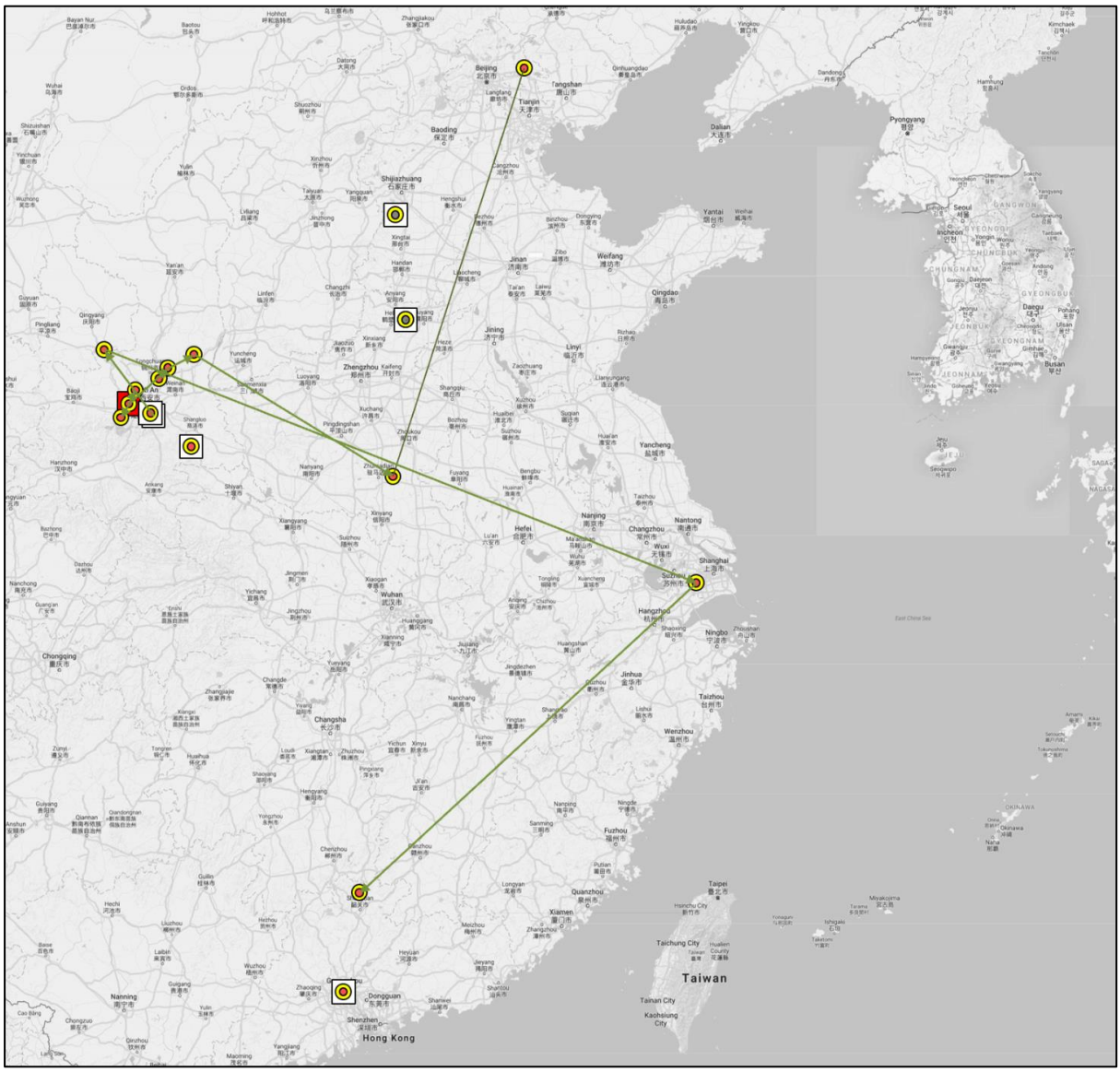

Example ‘single feature’ map based on ‘number of sides’.

Fig. 2.22:




Example ‘spread over time’ for Tang pagodas with *dougong* brackets.

Fig. 2.23:



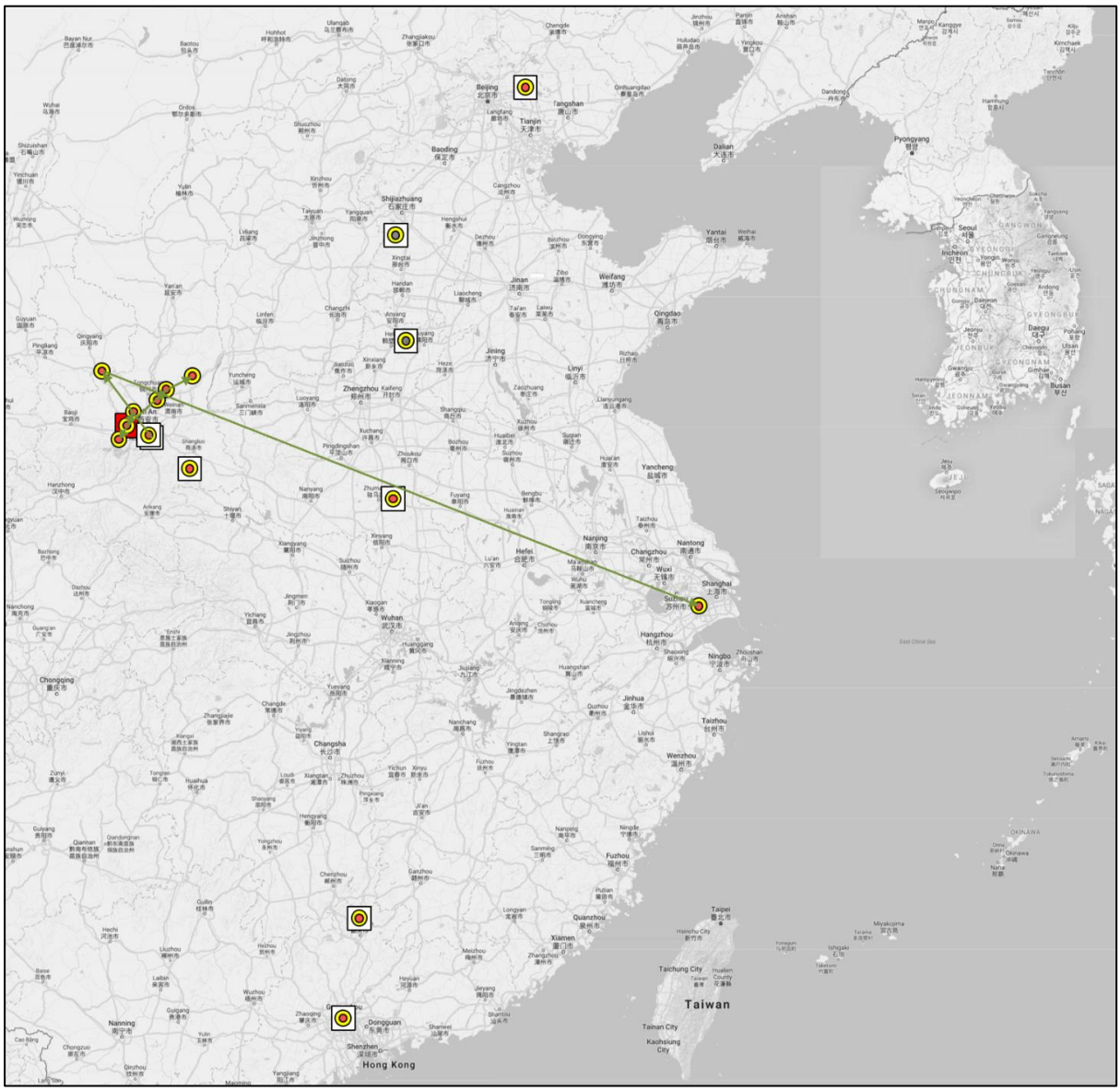

Example ‘spread by similarity’ map for Tang pagodas with *dougong* brackets based on a ‘similarity index’ of nine.

Fig. 2.24:

| *Distance apart* | None | Low | Medium | High |
|---|---|---|---|---|
| *less than 50 km* | 0 | 0 | 0 | 0 |
| *50-100 km* | 0 | 0 | -1 | -1 |
| *100-200 km* | 0 | 0 | -1 | -2 |
| *200-500 km* | 0 | -1 | -2 | -3 |
| *over 500 km* | 0 | -1 | -2 | -4 |

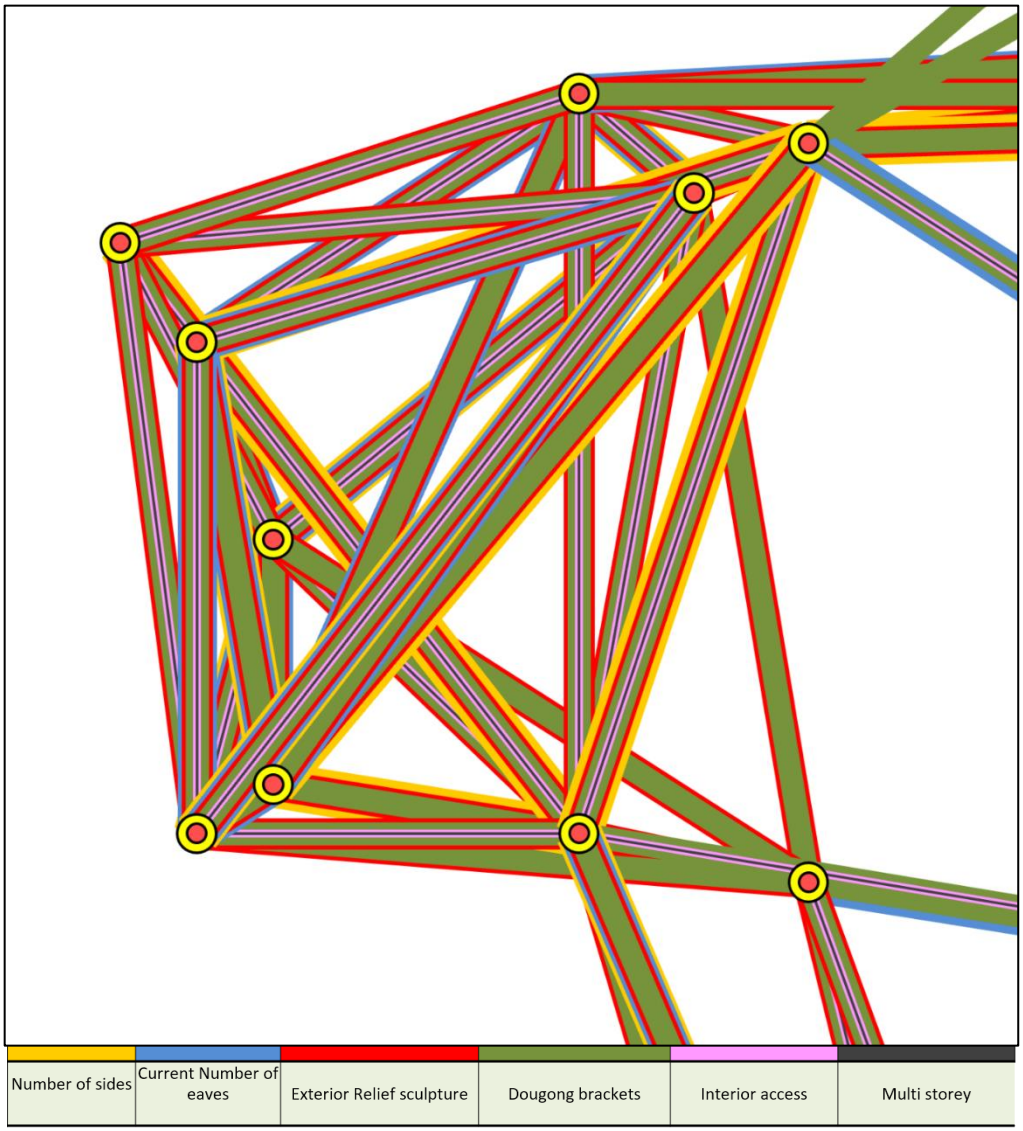
Table of ‘distance offset’ values for ‘spread by similarity’ maps.

Fig. 2.25:



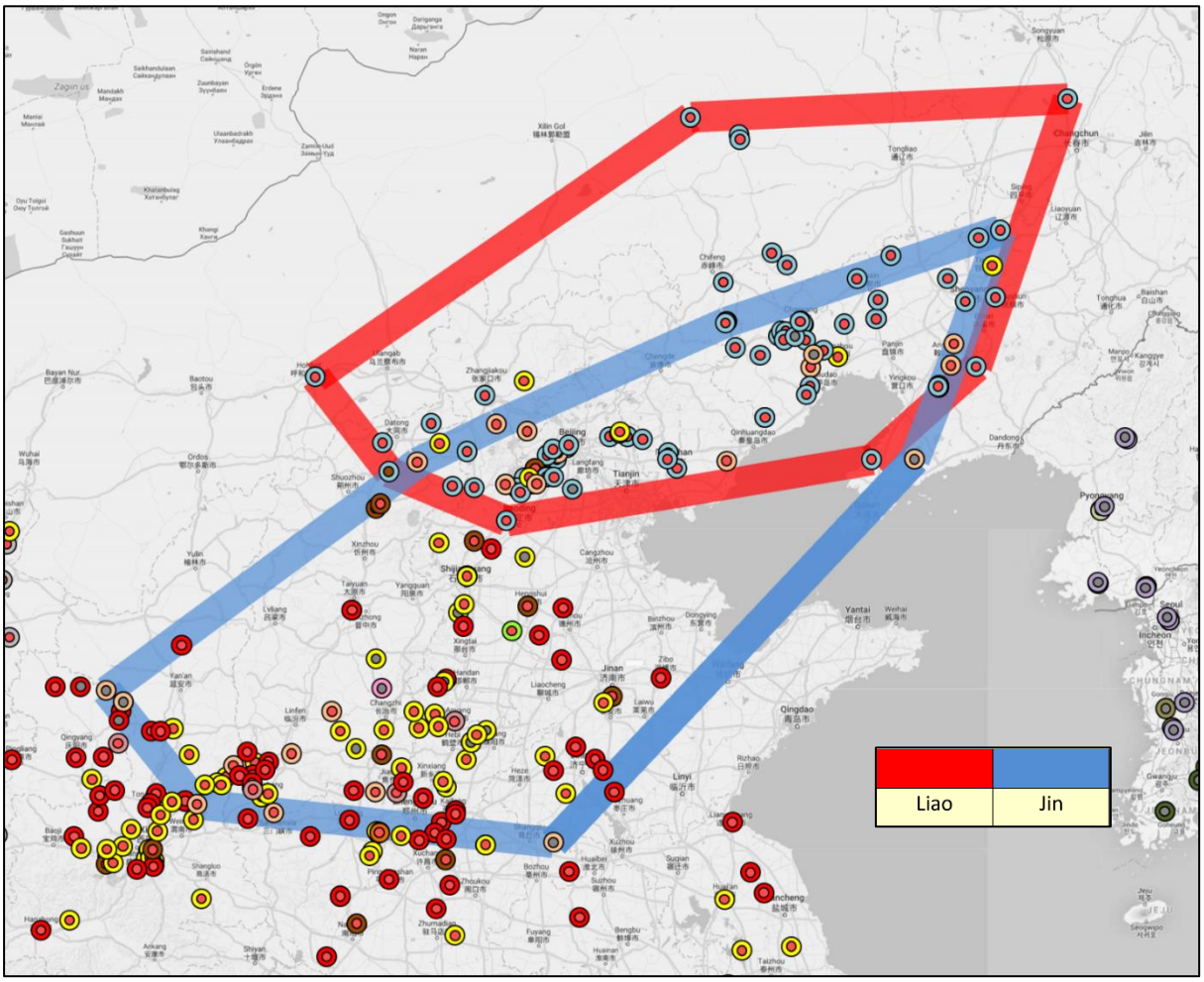

Example ‘spread by similarity’ map for Tang pagodas with *dougong* brackets based on a ‘similarity index’ of nine with a low ‘distance offset’ applied.

Fig. 2.26:




Example ‘feature connectivity’ map with ‘de-clutter’ offset applied showing Tang pagodas with *dougong* brackets in Shaanxi.

Fig. 2.27:



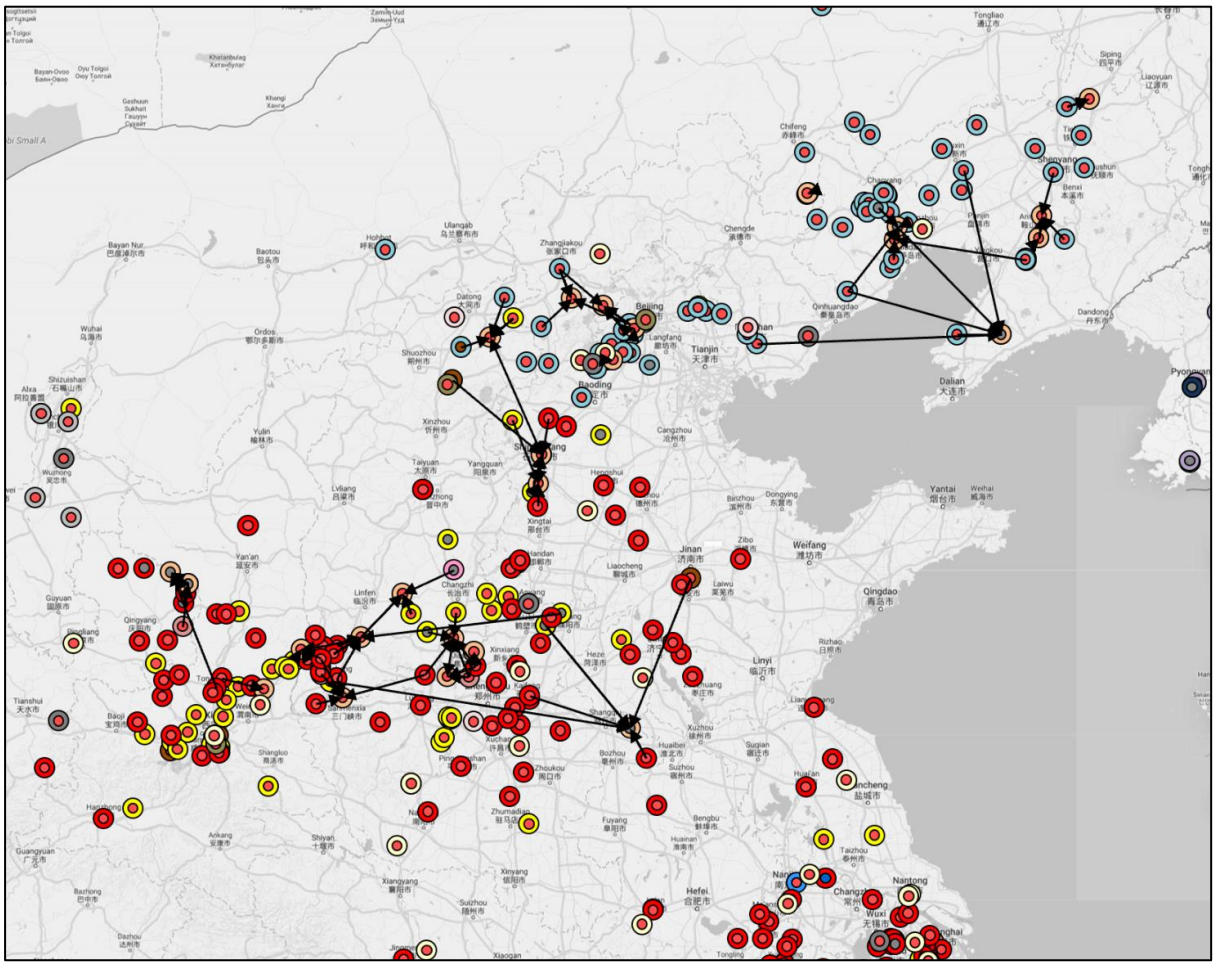

Example ‘Venn diagram’ map comparing the geographical extent of Liao and Jin pagodas.

Fig. 2.28:

| Summary Table | | | |
|---|---|---|---|
| Originating polity | Number of originating sites | Influenced polity | Number of influenced sites |
| Song | 19 | Jin | 13 |
| Liao | 22 | Jin | 12 |
| Tang | 11 | Jin | 10 |
| Five Dynasties | 3 | Jin | 5 |
| Sui | 2 | Jin | 2 |

Example ‘influence’ summary table for Jin pagodas.

Fig. 2.29:




Example ‘influence’ map showing potential influences on Jin pagodas.

Fig. 2.30:

| 42% | 22% | 36% | 36% | 29% | 36% |
|---|---|---|---|---|---|
| 12.90 ( 4 with no data ) | 12.52 ( 2 with no data ) | 12.71 ( 4 with no data ) | 13.02 ( 5 with no data ) | 12.78 ( 6 with no data ) | 12.85 ( 5 with no data ) |
| (1) All pagodas of the same polity | (2) All pagodas within 200 km | (3) All pagodas built in the 100 years prior to this pagoda's own construction | (4) All pagodas of the same polity AND within 200 km | (5) All pagodas of the same polity AND built in the 100 years prior to this pagoda's own construction | (6) All pagodas within 200 km AND built in the 100 years prior to this pagoda's own construction |

Example results from 'period, polity, place' analysis of Japanese pagodas.

Fig. 3.1:

| Polity | Number of pagodas in database | Number of duplicate holistic designs | Percentage of duplicate holistic designs |
|---|---|---|---|
| Heian | 7 | 3 | 43% |
| Silla | 25 | 10 | 40% |
| Wuyue | 5 | 2 | 40% |
| Liao | 74 | 27 | 36% |
| Kamakura | 9 | 3 | 33% |
| Song | 209 | 49 | 23% |
| Xixia | 5 | 1 | 20% |
| Sui | 6 | 1 | 17% |
| Jin | 28 | 4 | 14% |
| Goryeo | 16 | 2 | 13% |
| Five Dynasties | 8 | 1 | 13% |
| Tang | 66 | 7 | 11% |

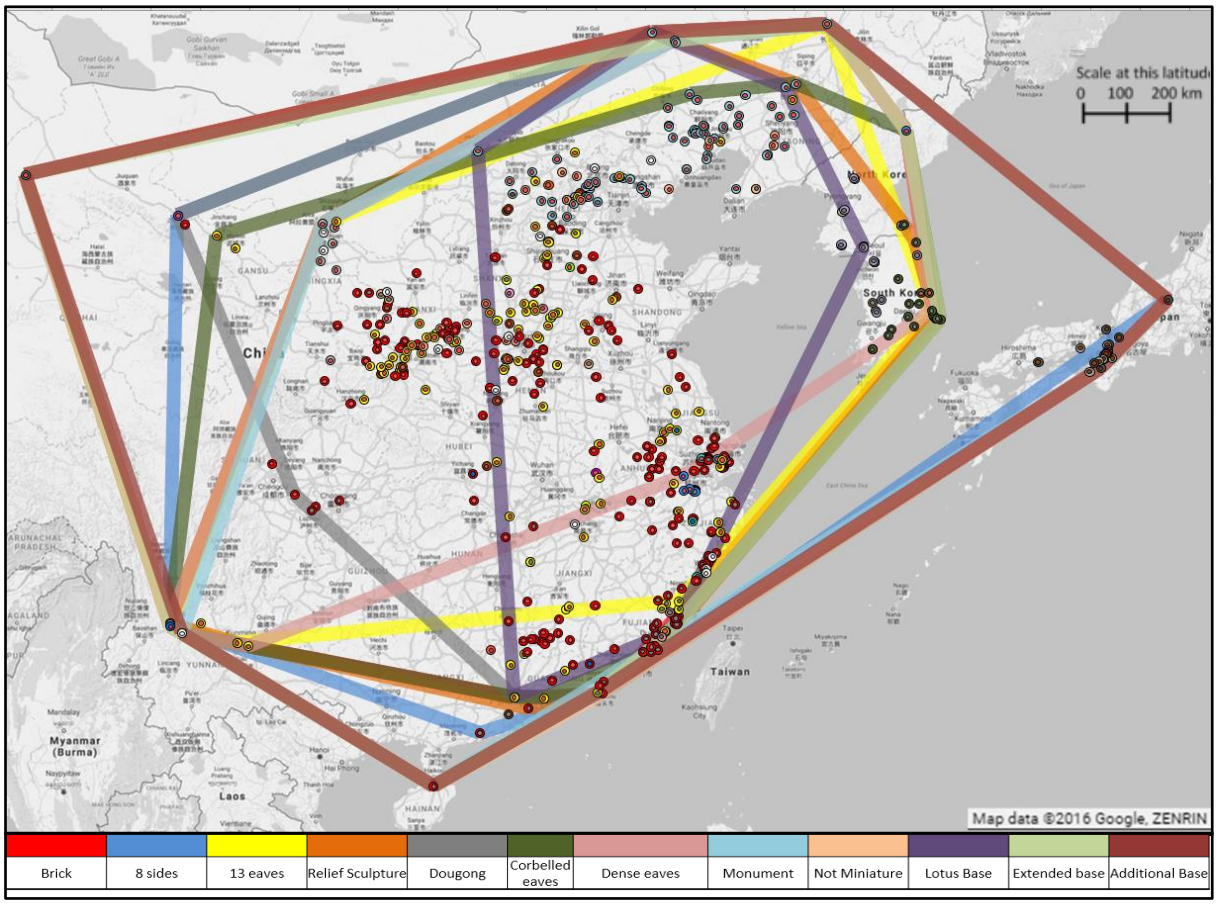
Table displaying percentage of pagodas to feature the same holistic design - organised by polity (limited to polities with five or more pagodas).

Fig. 3.2:

Daming Pagoda – West Face

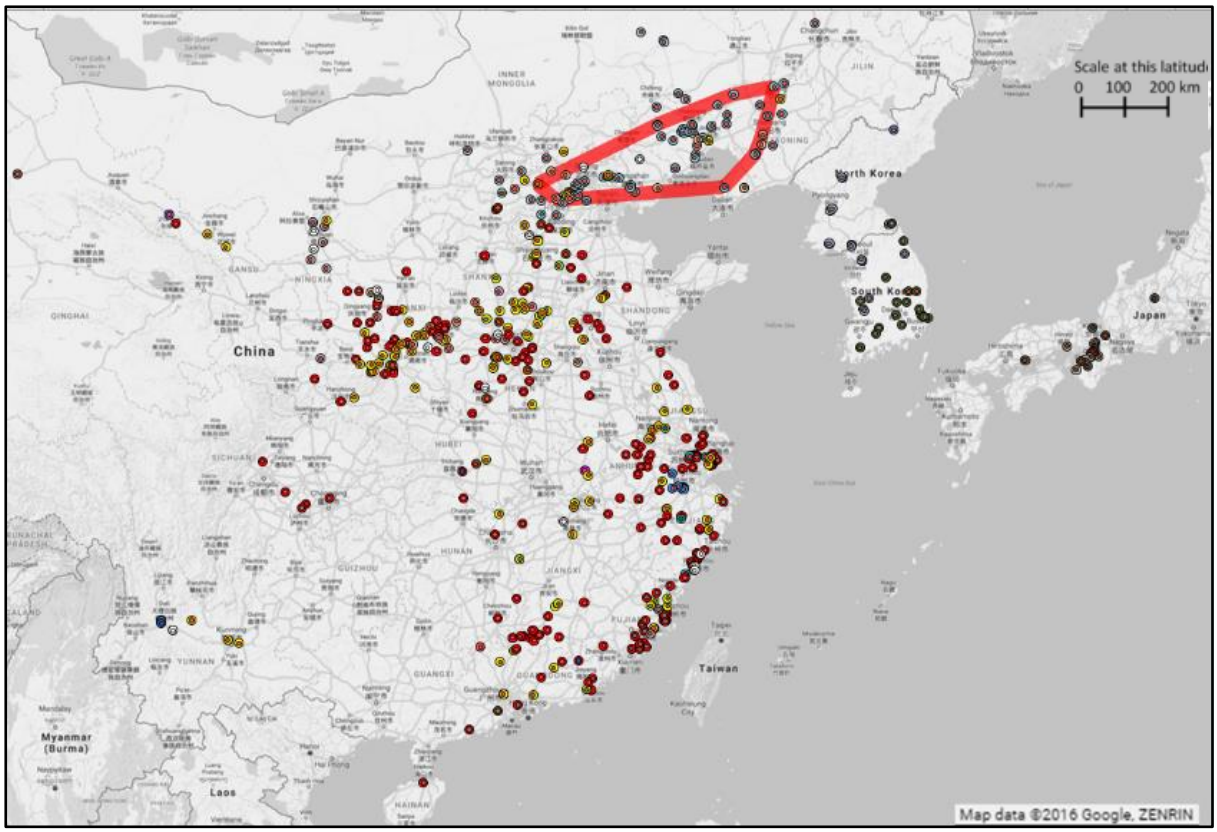
(Dugdale: 2015).

Fig. 3.3:



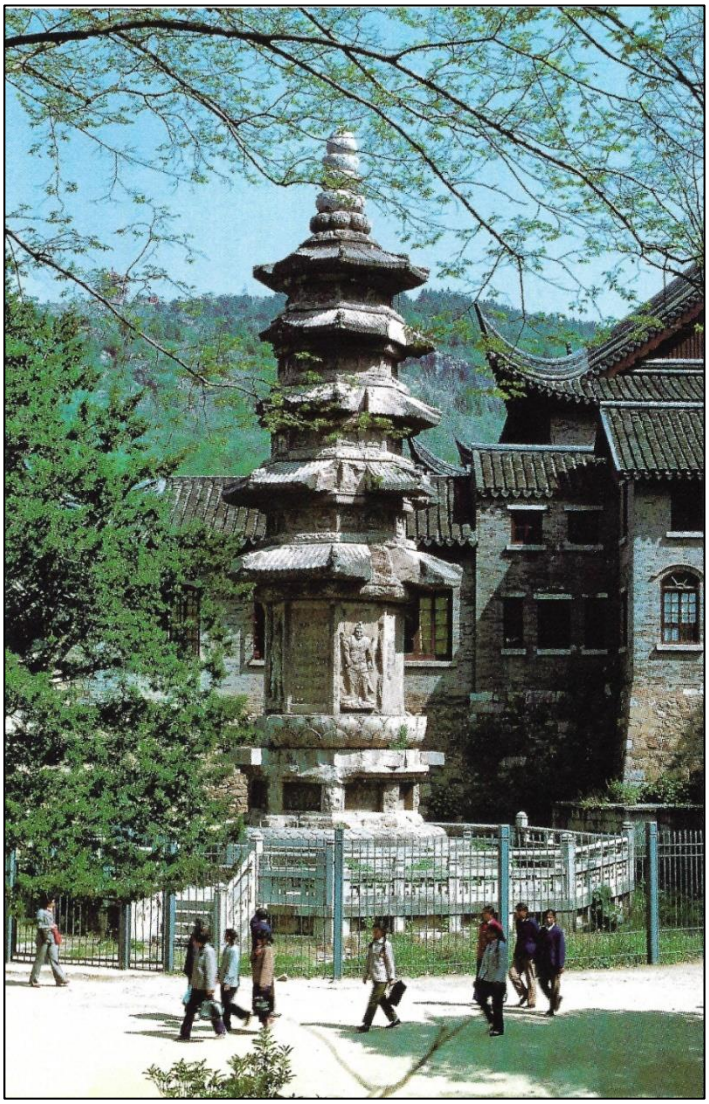

Geographical distribution of the most common variable recorded for the Liao in each field of the HEAP Database.

Fig. 3.4:



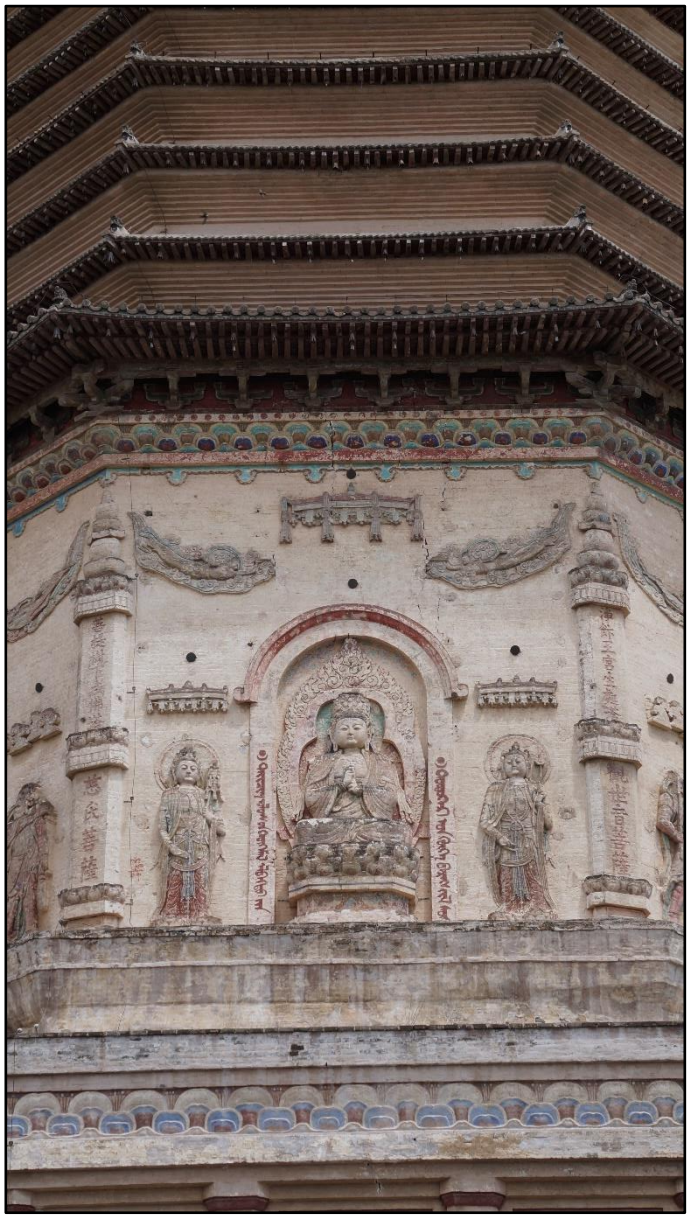

Geographical distribution of pagodas with all the Liao archetypal features.

Fig. 3.5:



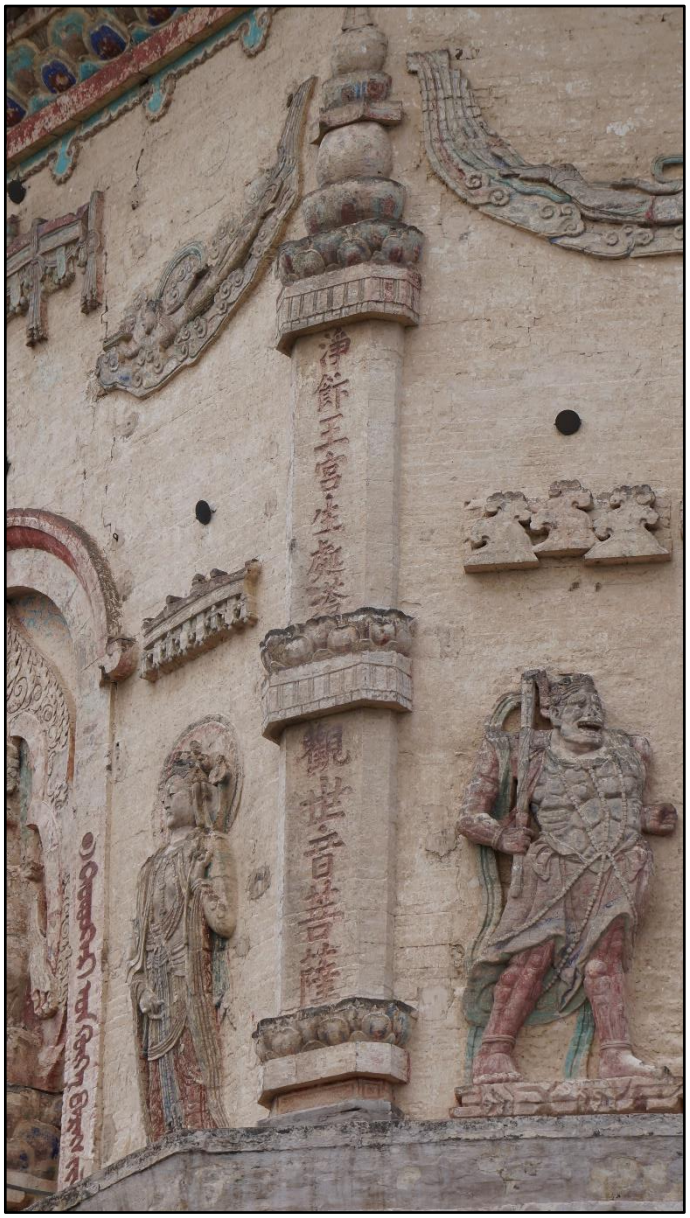
Qixiasi Sheli Pagoda (after Steinhardt and Fu 2002:123).

Fig. 3.6:



Relief carving on the south face of the Daming Pagoda (Dugdale: 2015).

Fig. 3.7:

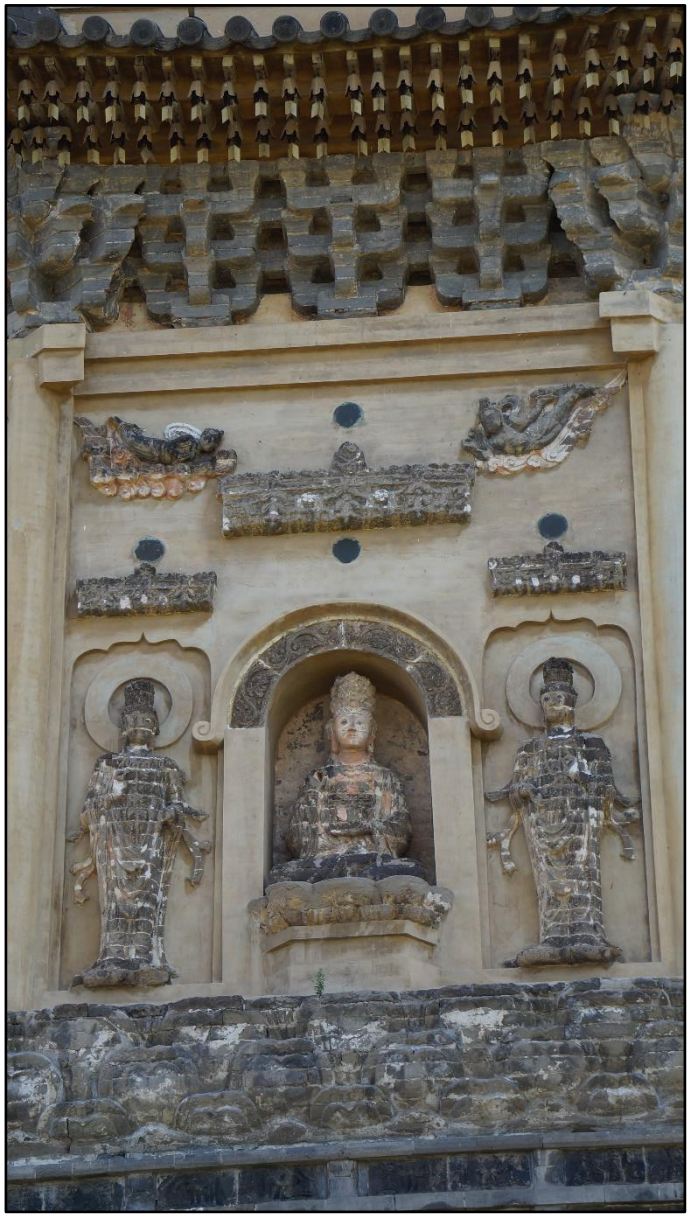


Carving of a dharani pillar on the corner between the south and south-east faces of the Daming Pagoda (Dugdale: 2015).

Fig. 3.8:

North face of the Chaoyang North Pagoda (Dugdale: 2015).

Fig. 3.9:



South face of the Beizhen West Pagoda (Dugdale: 2015).

Fig. 3.10:

Qingzhou White Pagoda

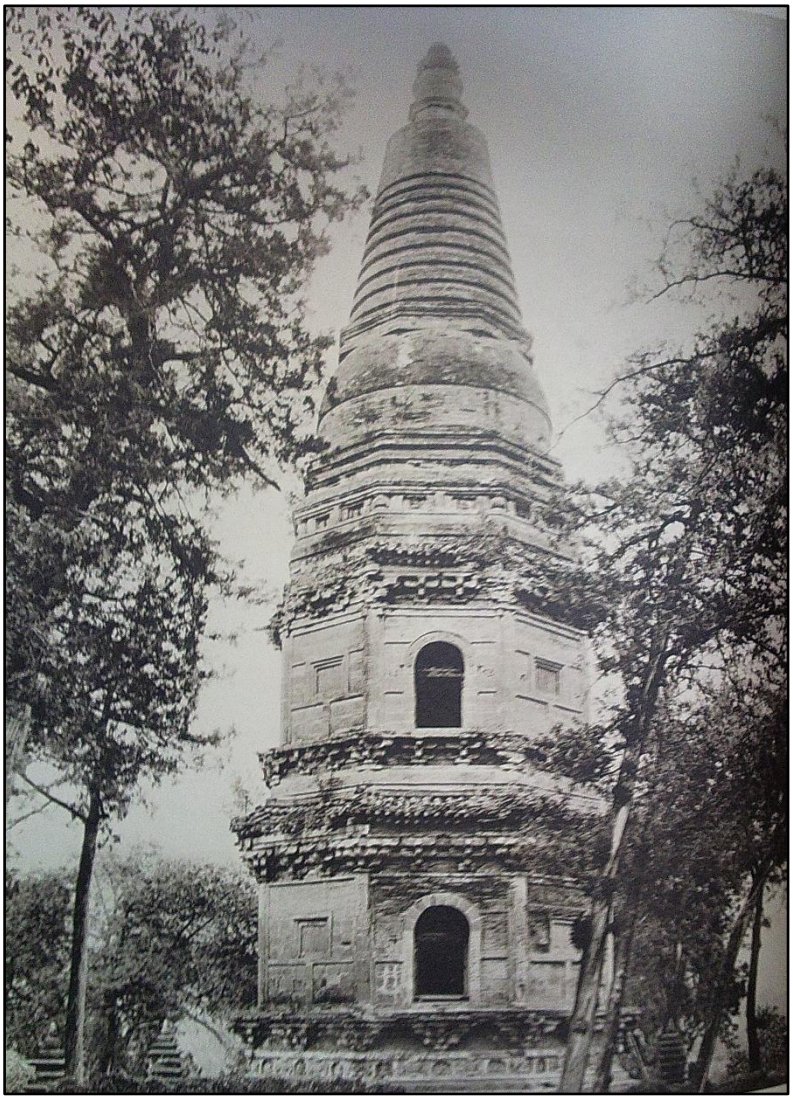
(Dugdale: 2015).

Fig. 3.11:

Chaoyang North Pagoda

(Dugdale: 2015).

Fig. 3.12:



Jixian White Pagoda (after Sekino and Takeshima: 1925:47).

Fig. 3.13:

Comparison of Fogongsi Pagoda (left) and Zhuozhou South Pagoda (right) (Dugdale: 2015).

Fig. 3.14:

Qinghuasi Flower Pagoda

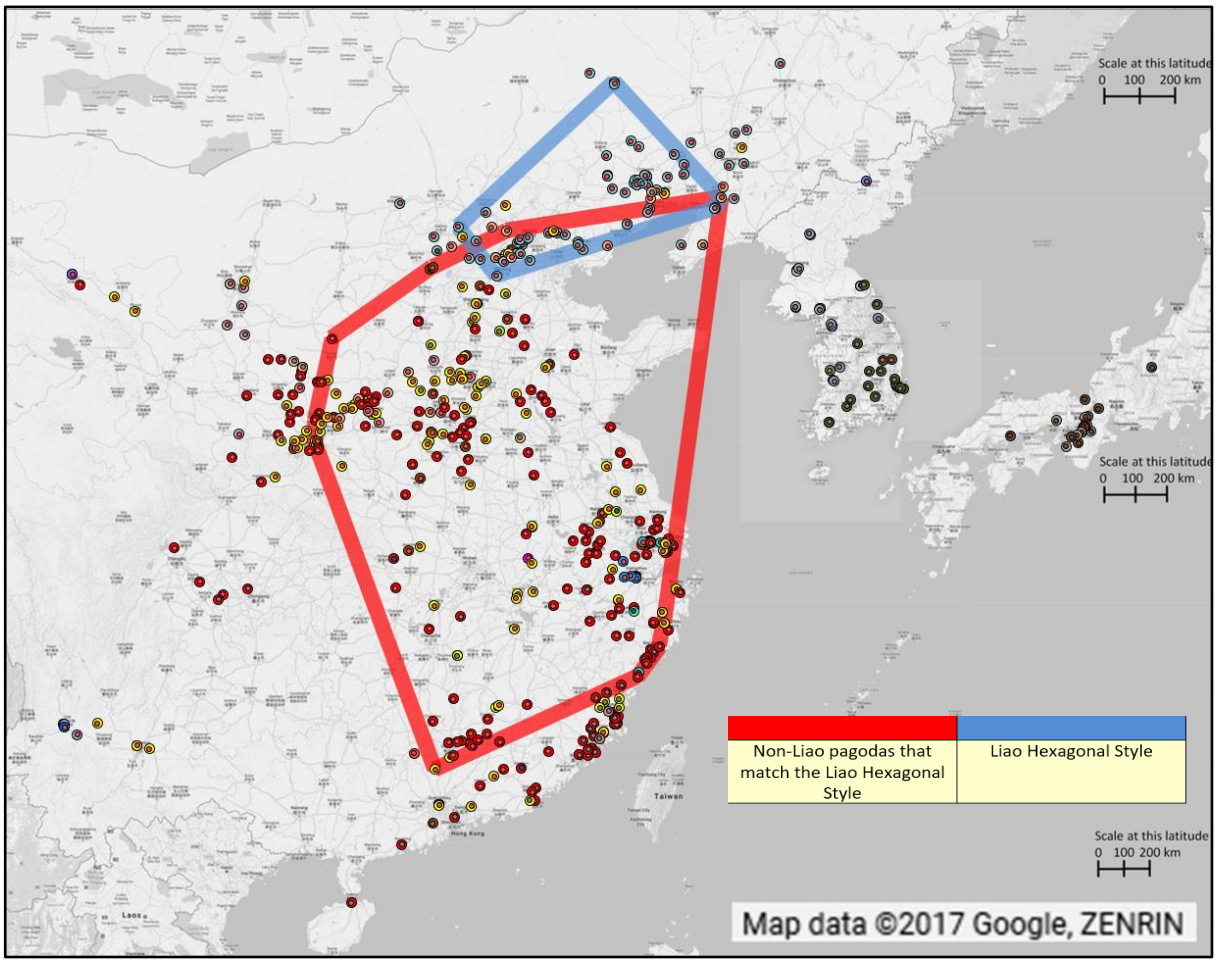
(Dugdale: 2015).

Fig. 3.15:

Shangjing North Pagoda

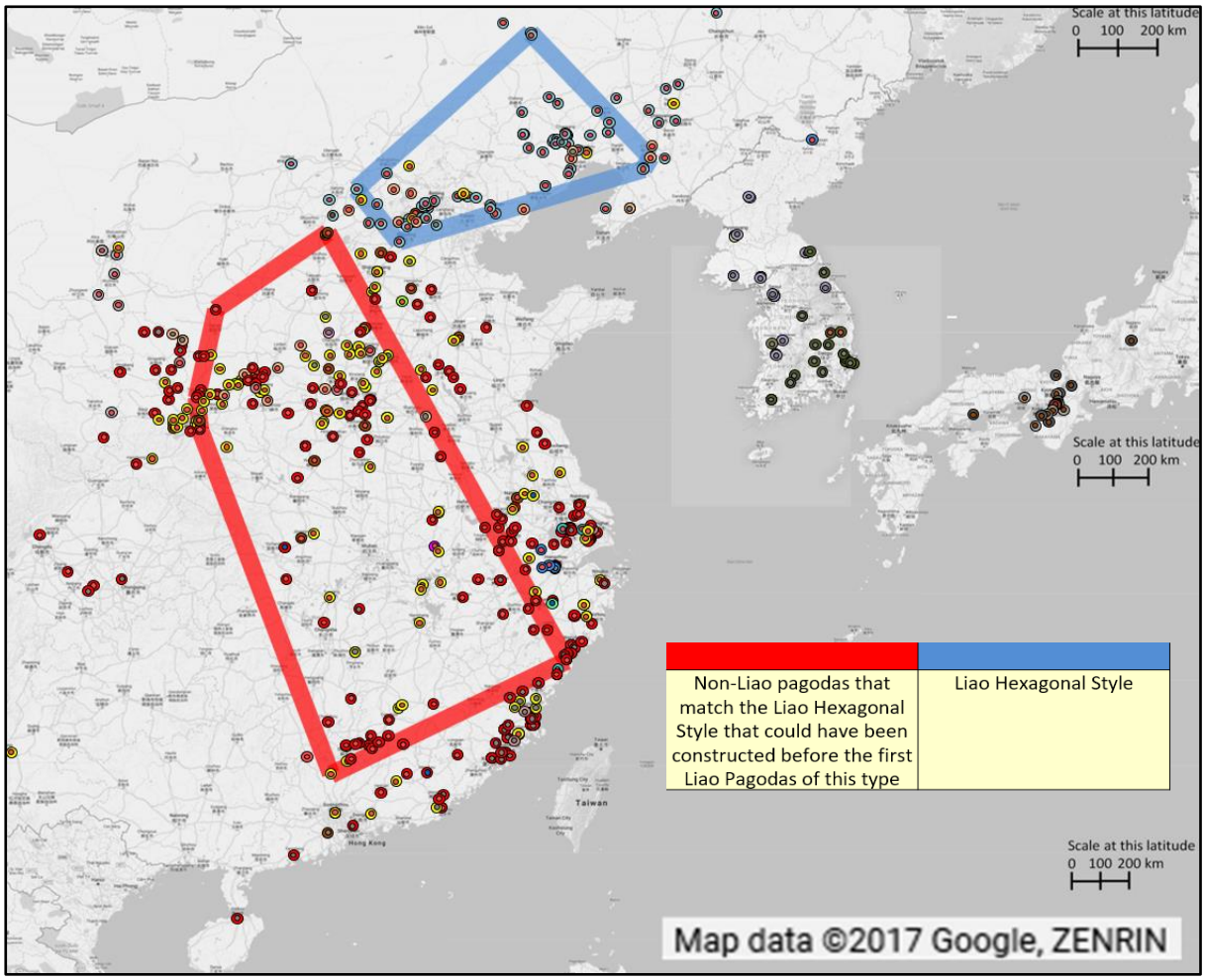
(Dugdale: 2015).

Fig. 3.16:




Comparison of the geographical distribution of Liao 'Hexagonal Style' pagodas with pagodas matching this style built by other polities.

Fig. 3.17:

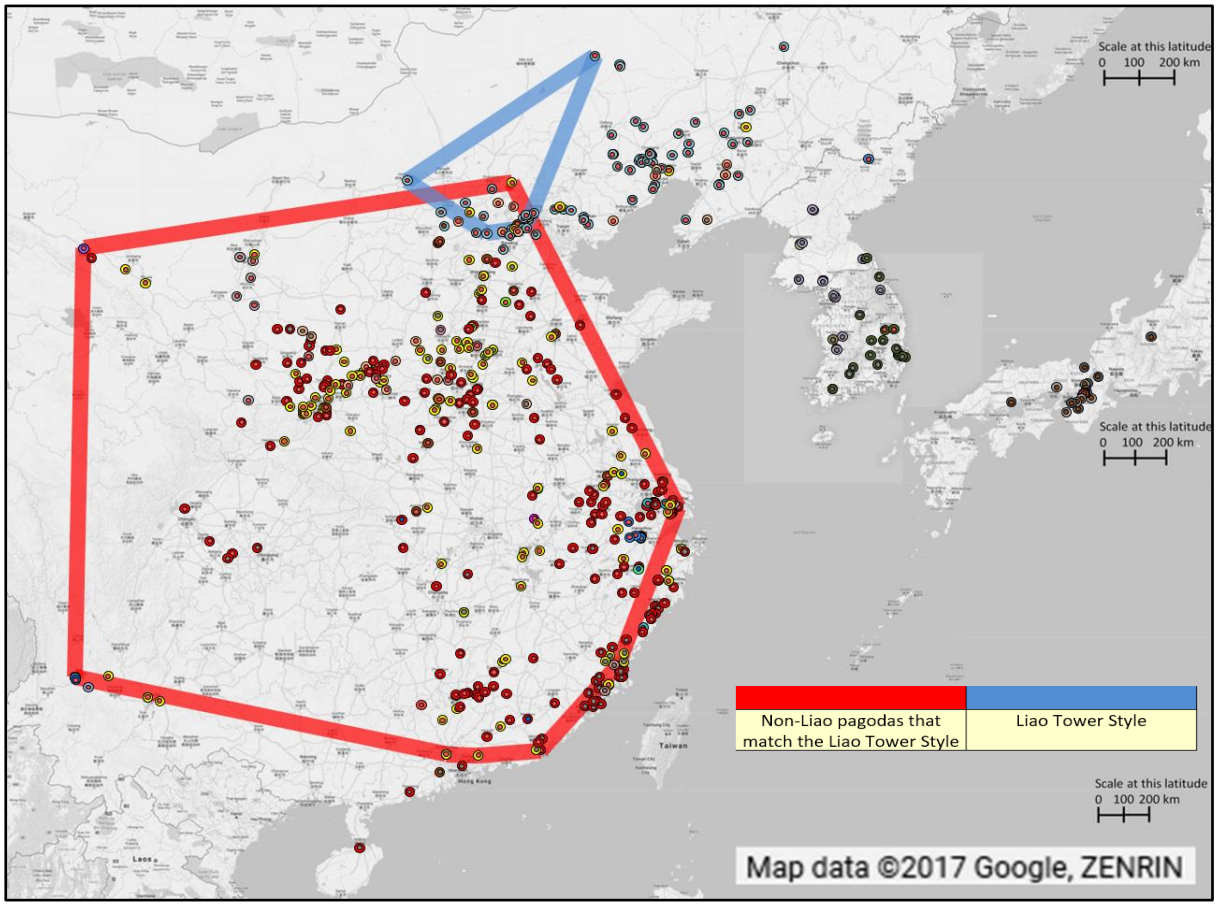



Comparison of the geographical distribution of Liao 'Hexagonal Style' pagodas with pagodas built in this style by other polities (filtered to only include pagodas that could potentially predate the first Liao examples).

Fig. 3.18:

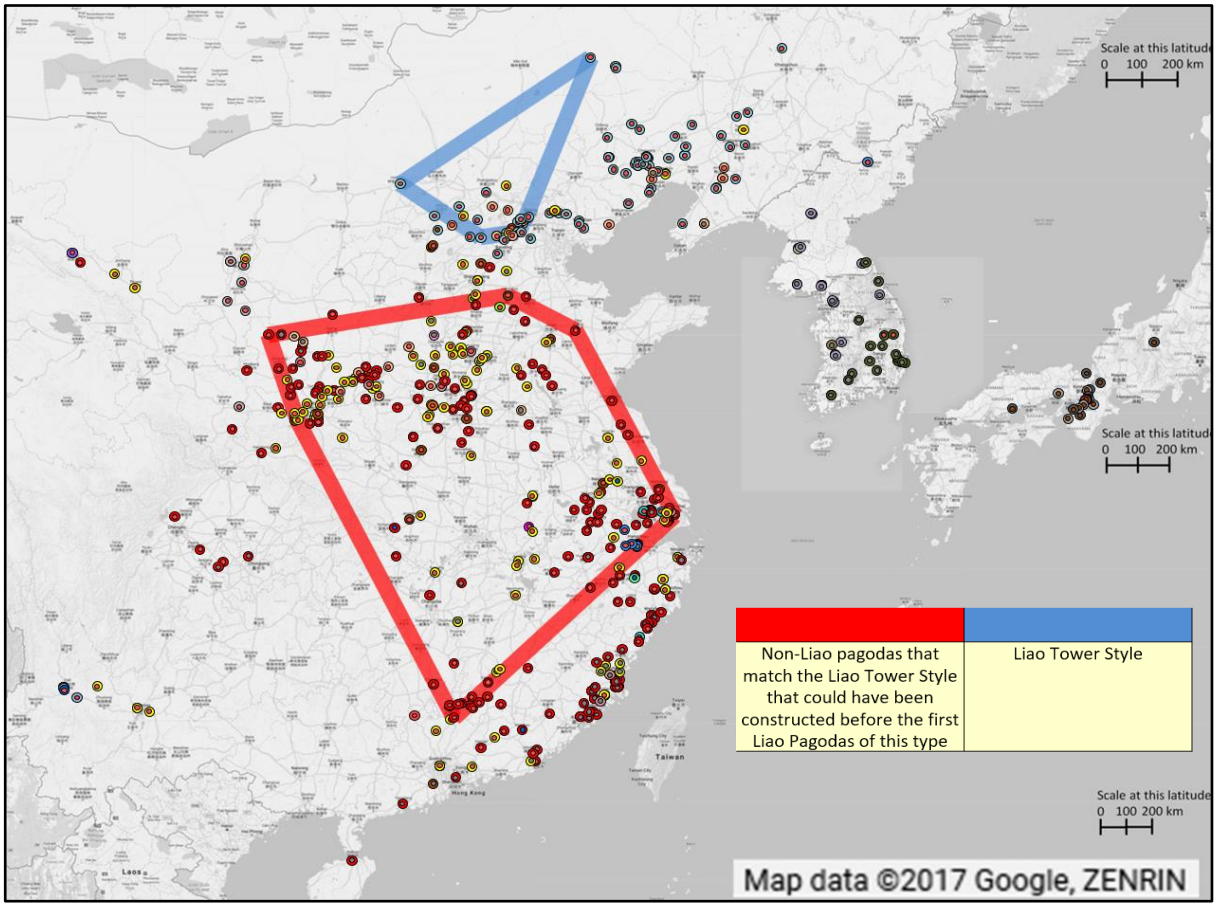
The excavated foundations of a hexagonal pagoda and two satellite pagodas at Liao Shangjing (After Chen 2014:146).

Fig. 3.19:



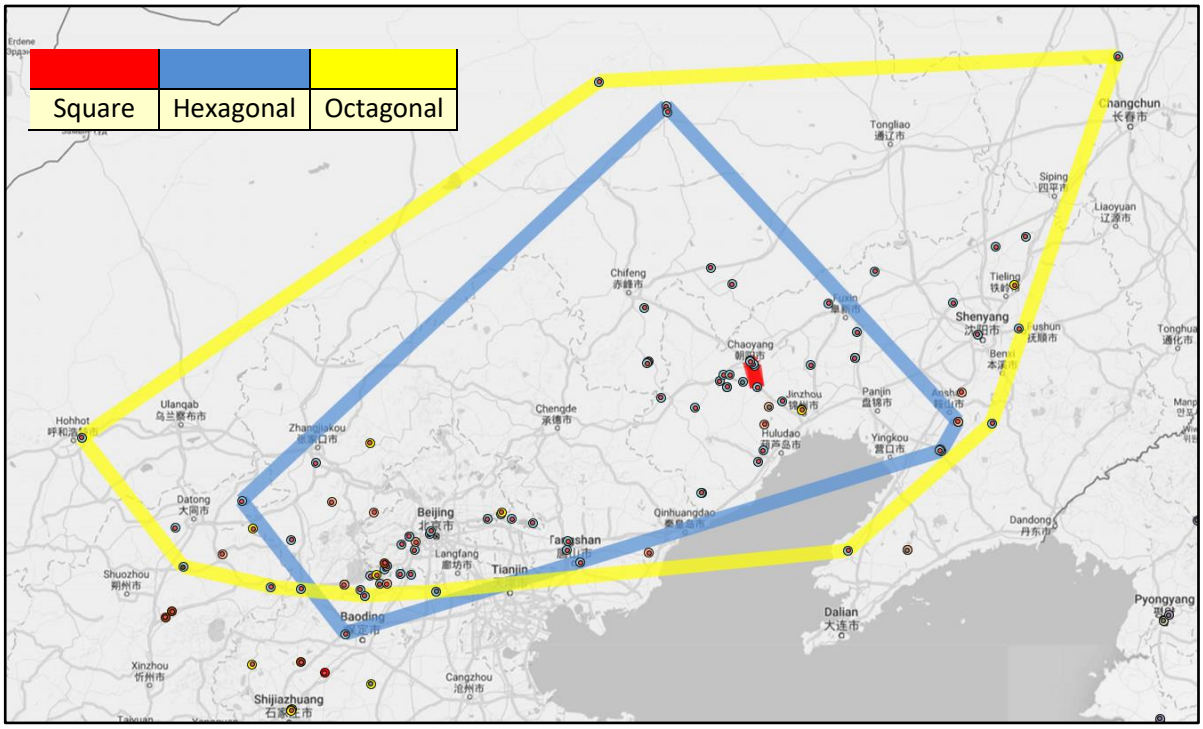

Comparison of the geographical distribution of Liao 'Tower Style' pagodas with pagodas built in this style by other polities.

Fig. 3.20:



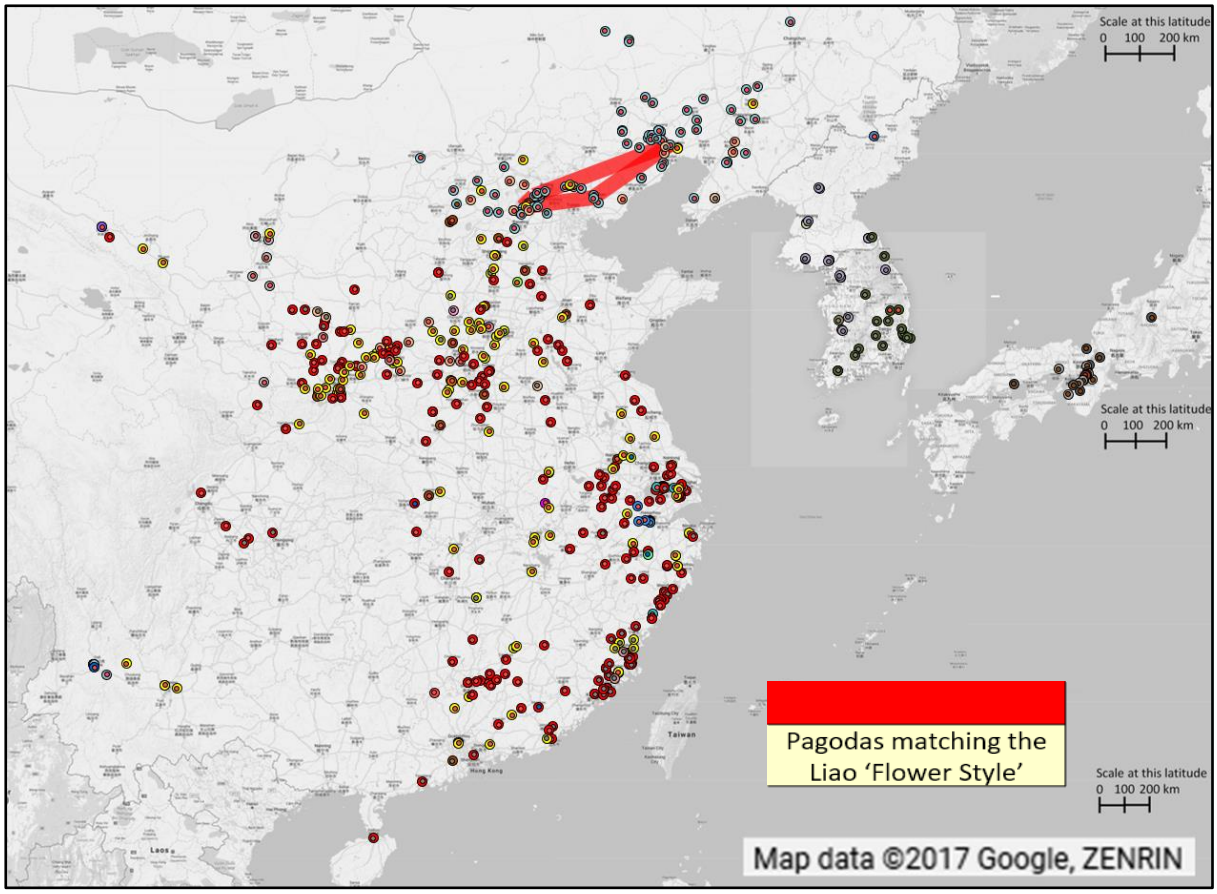

Comparison of the geographical distribution of Liao 'Tower Style' pagodas with pagodas built in this style by other polities (filtered to only include pagodas that could potentially predate the first Liao examples).

Fig. 3.21:




Comparison of the geographical distribution of different shaped ground plans of Liao pagodas.

Fig. 3.22:

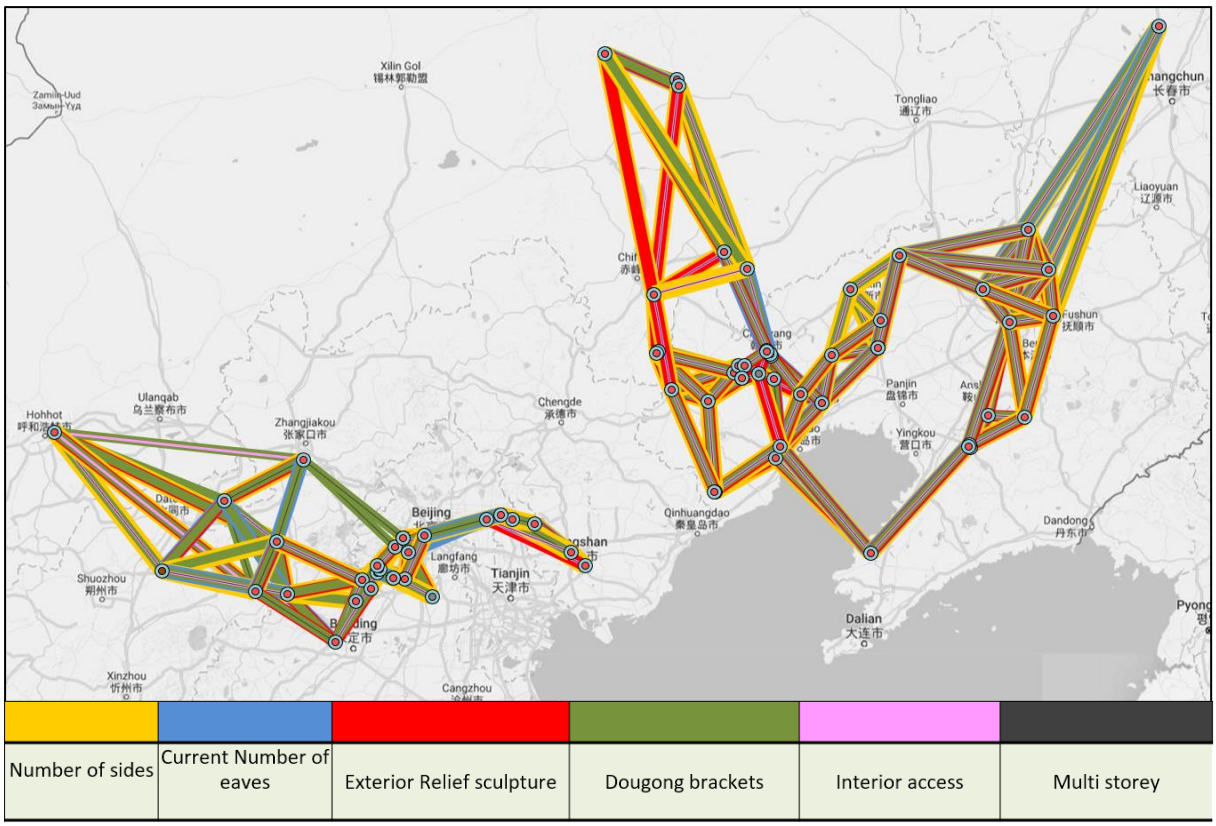



Geographical distribution of 'Flower Style' pagodas.

Fig. 3.23:

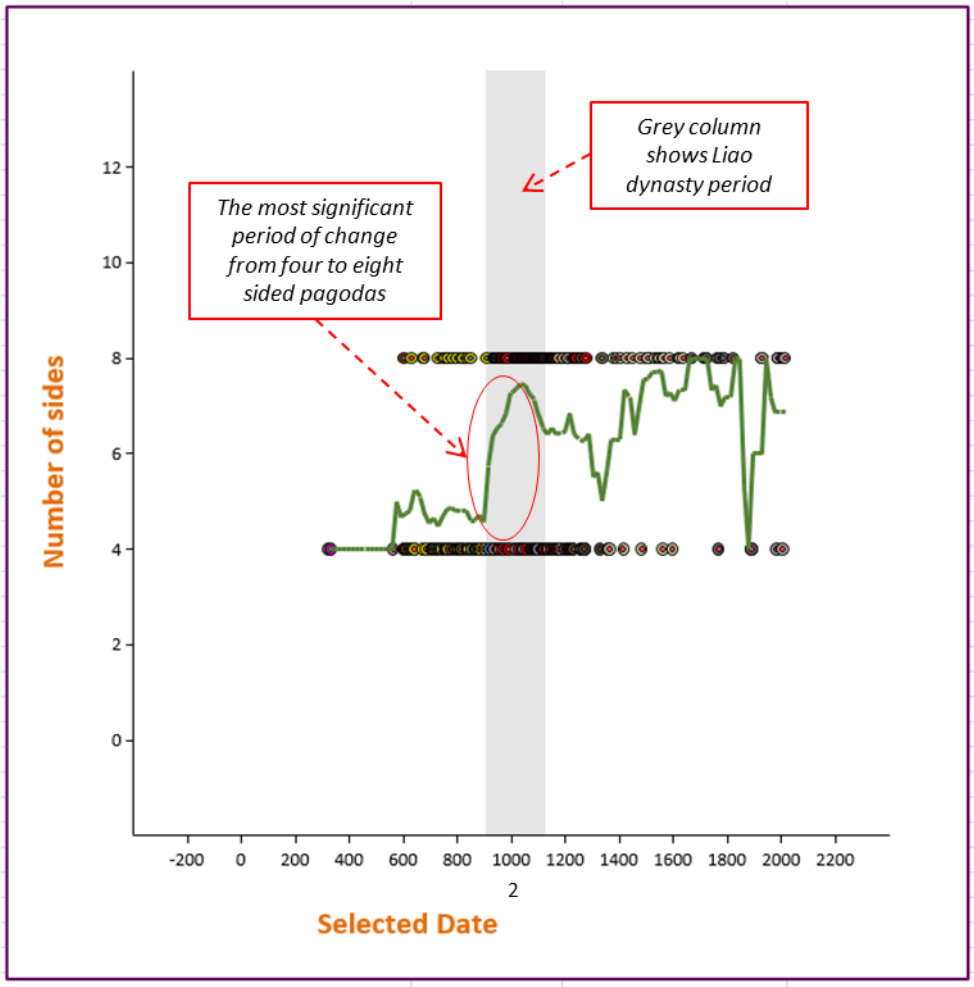
Huaishudong Pagoda (Image after: http://hk.plm.org.cn/gnews/2009106/2009106170010.html - accessed 31/08/16).

Fig. 3.24:



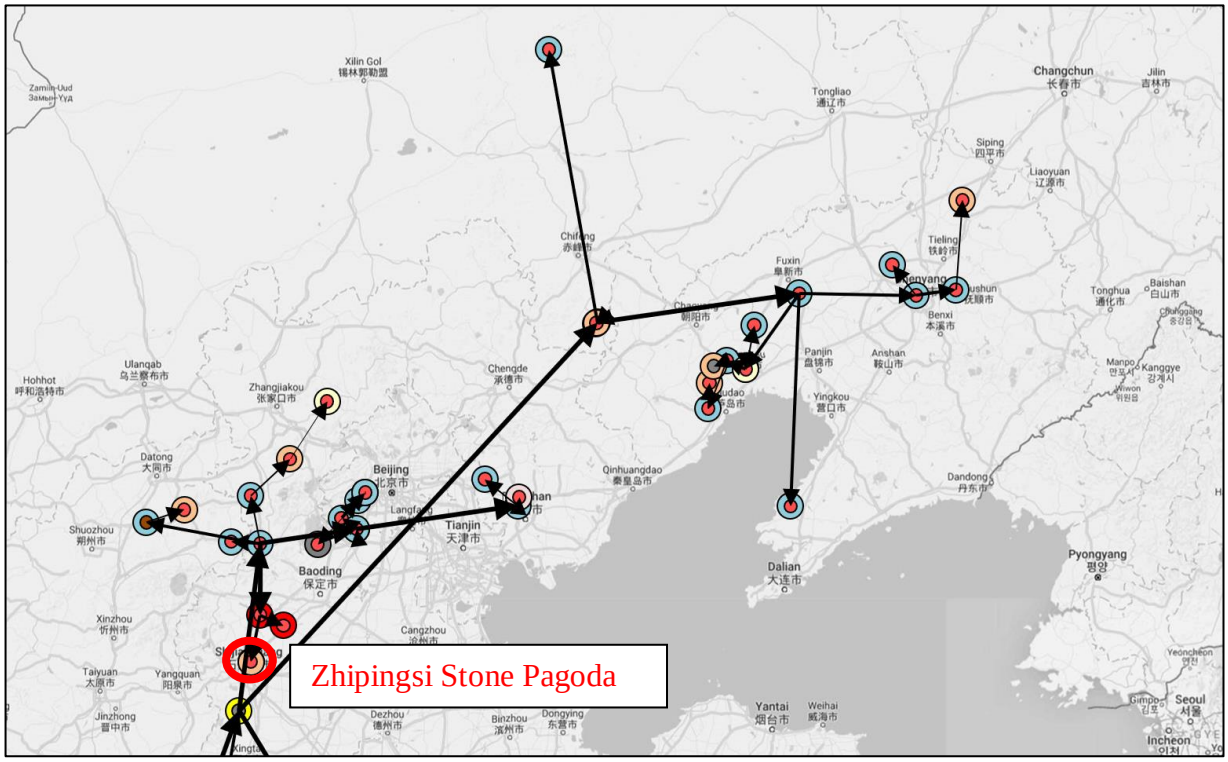

‘Feature connectivity’ map of Liao pagodas.

Fig. 3.25:



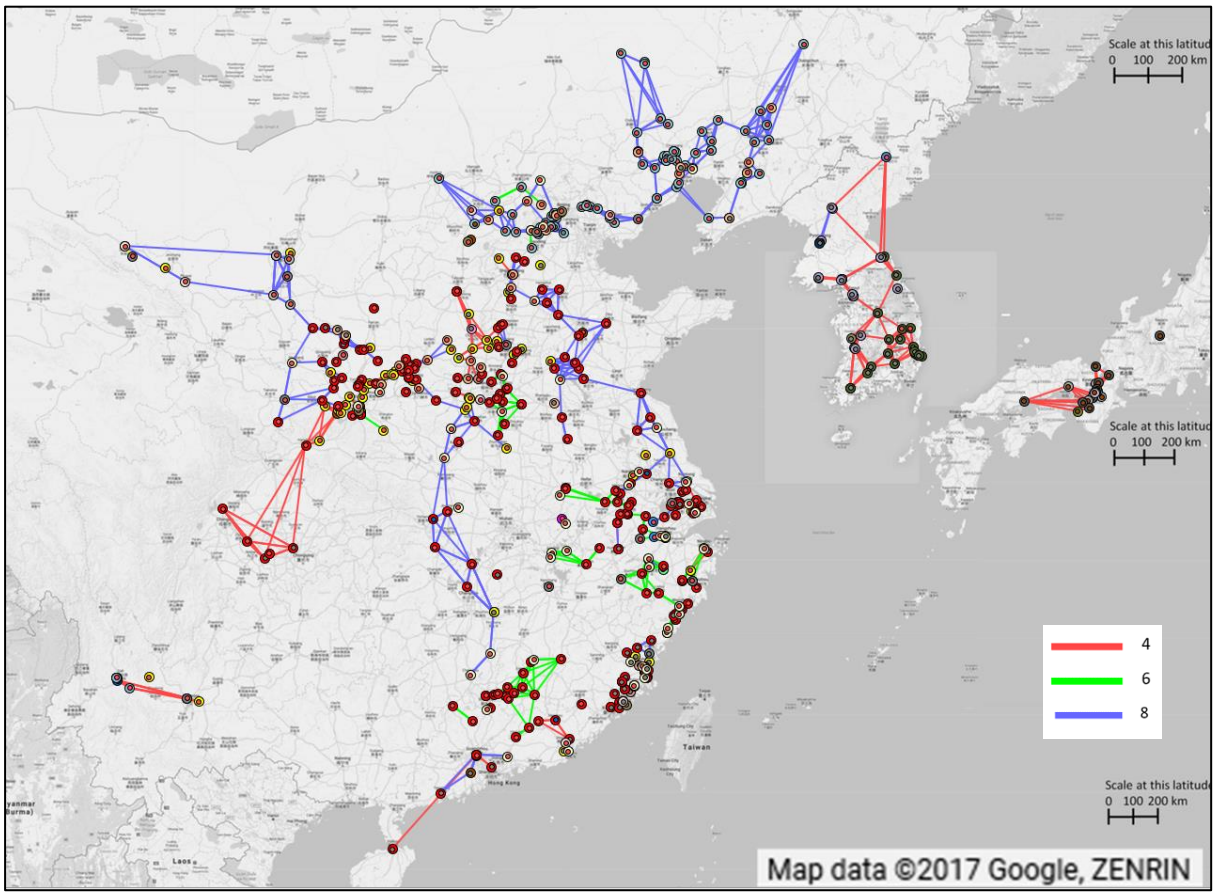

Scatter chart demonstrating the trend for 'number of sides' in pagoda design over time based on the mean date of construction for the current structure.

Fig. 3.26:



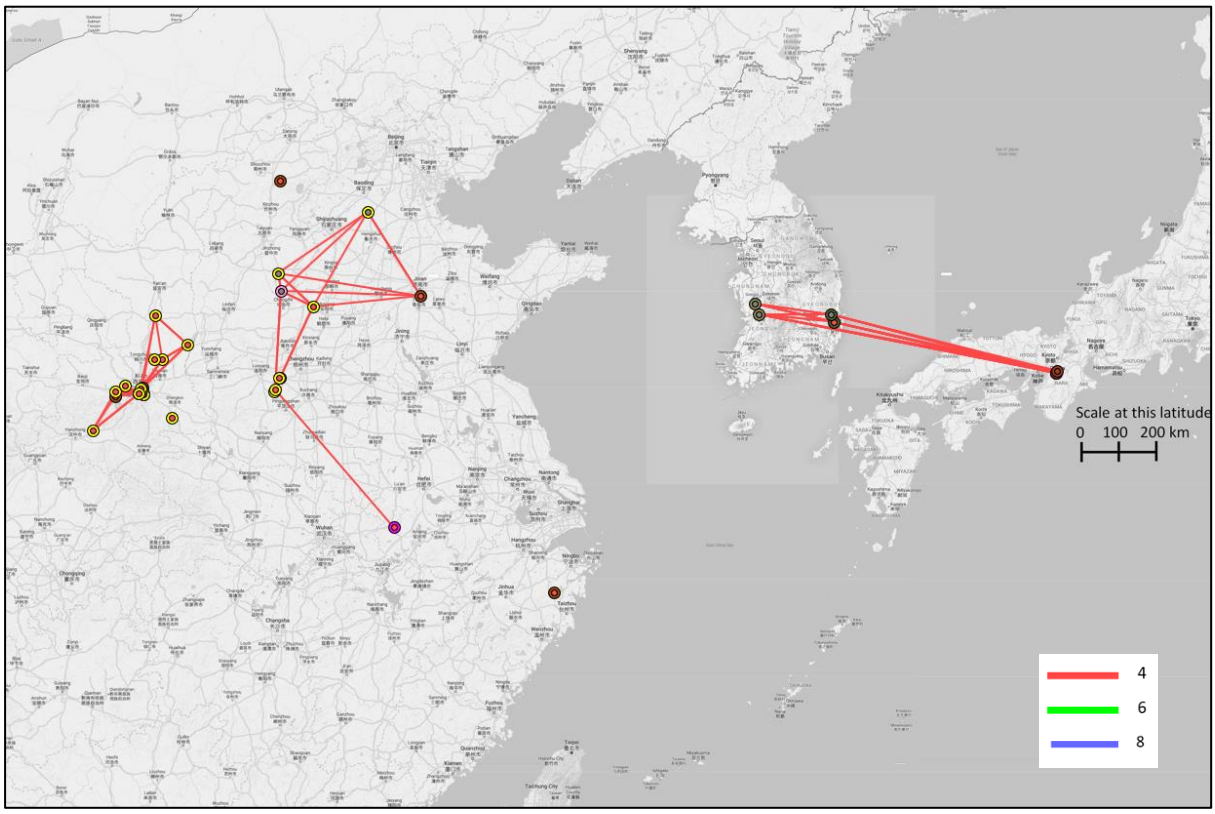

‘Spread over time’ map filtered to only include octagonal pagodas with a confirmed date (Zhipingsi Stone Pagoda has been highlighted in red).

Fig. 3.27:



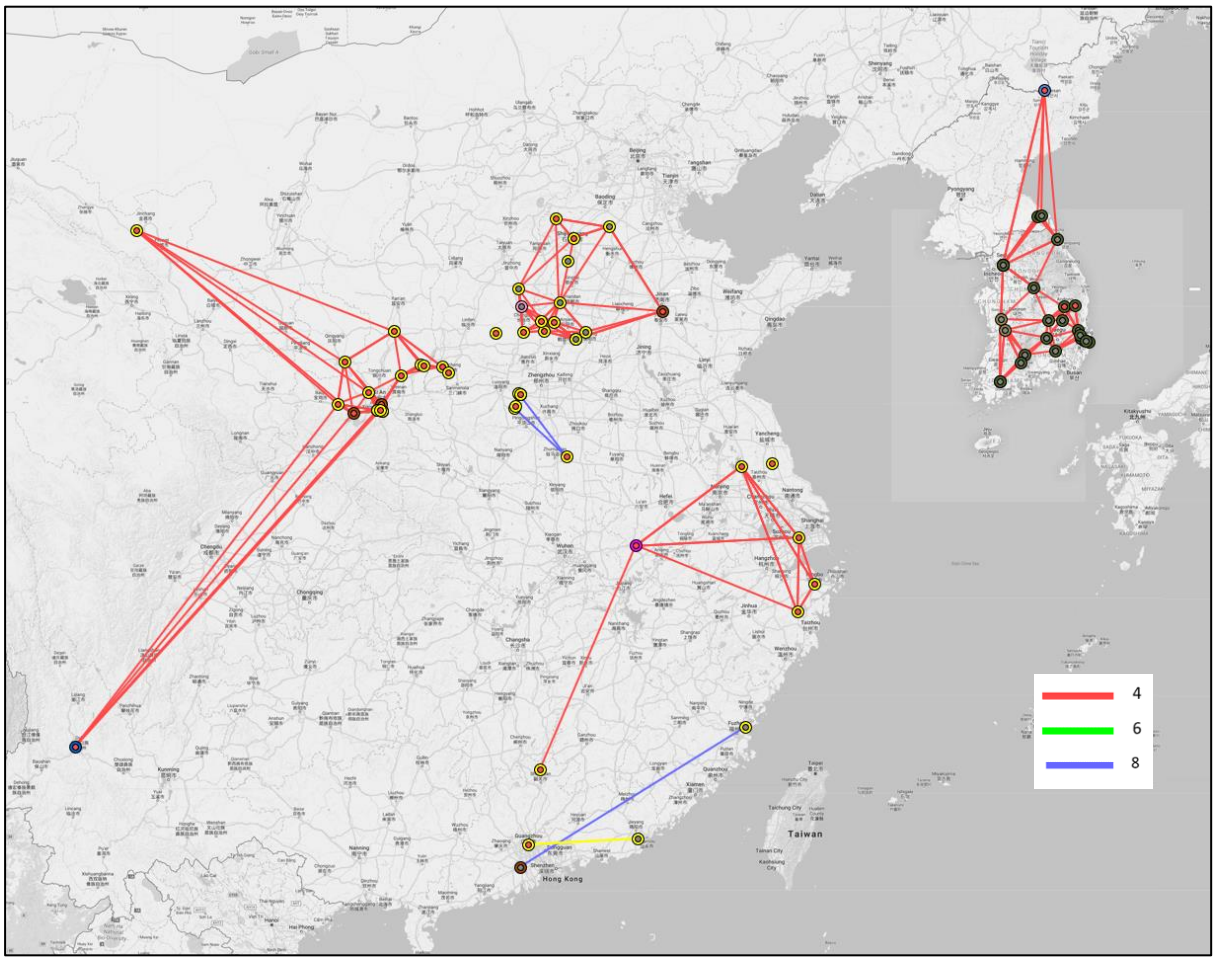

‘Single feature’ map based on ‘number of sides’.

Fig. 3.28:



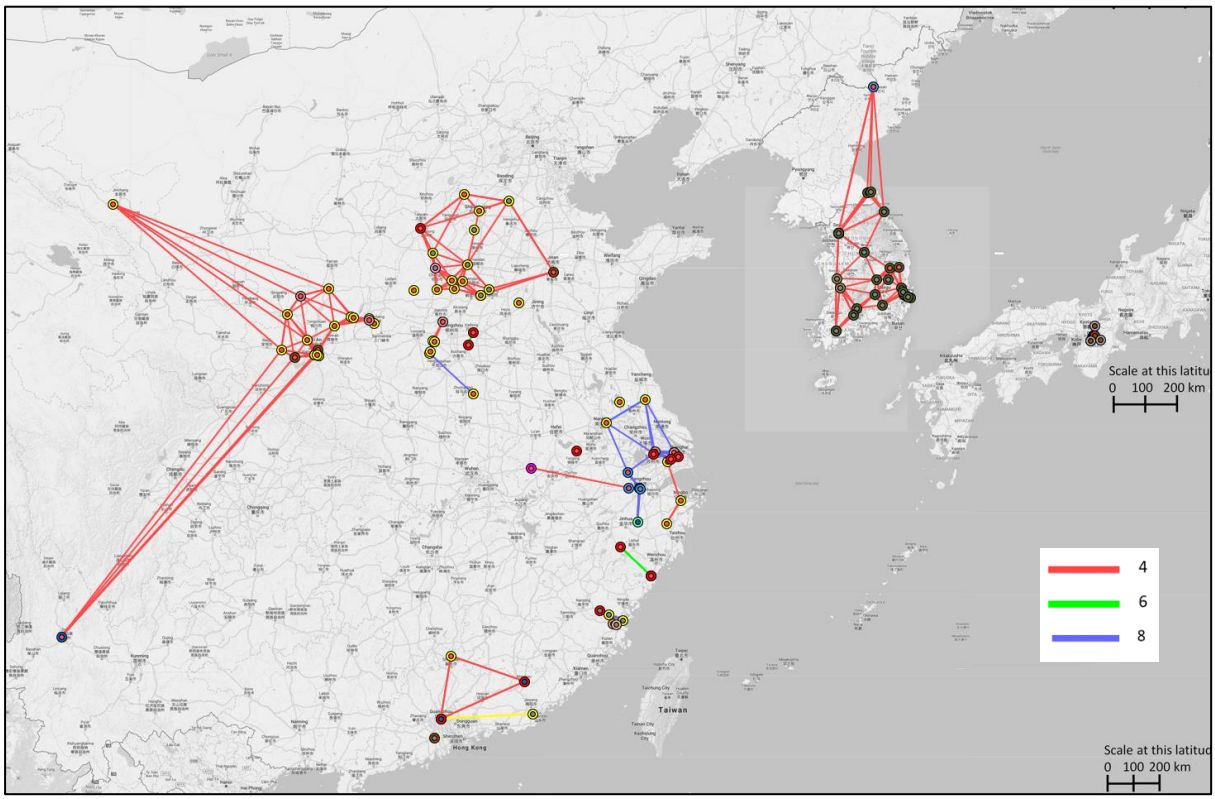

‘Single feature’ map based on ‘number of sides’, filtered to pagodas with a confirmed date pre-750.

Fig. 3.29:



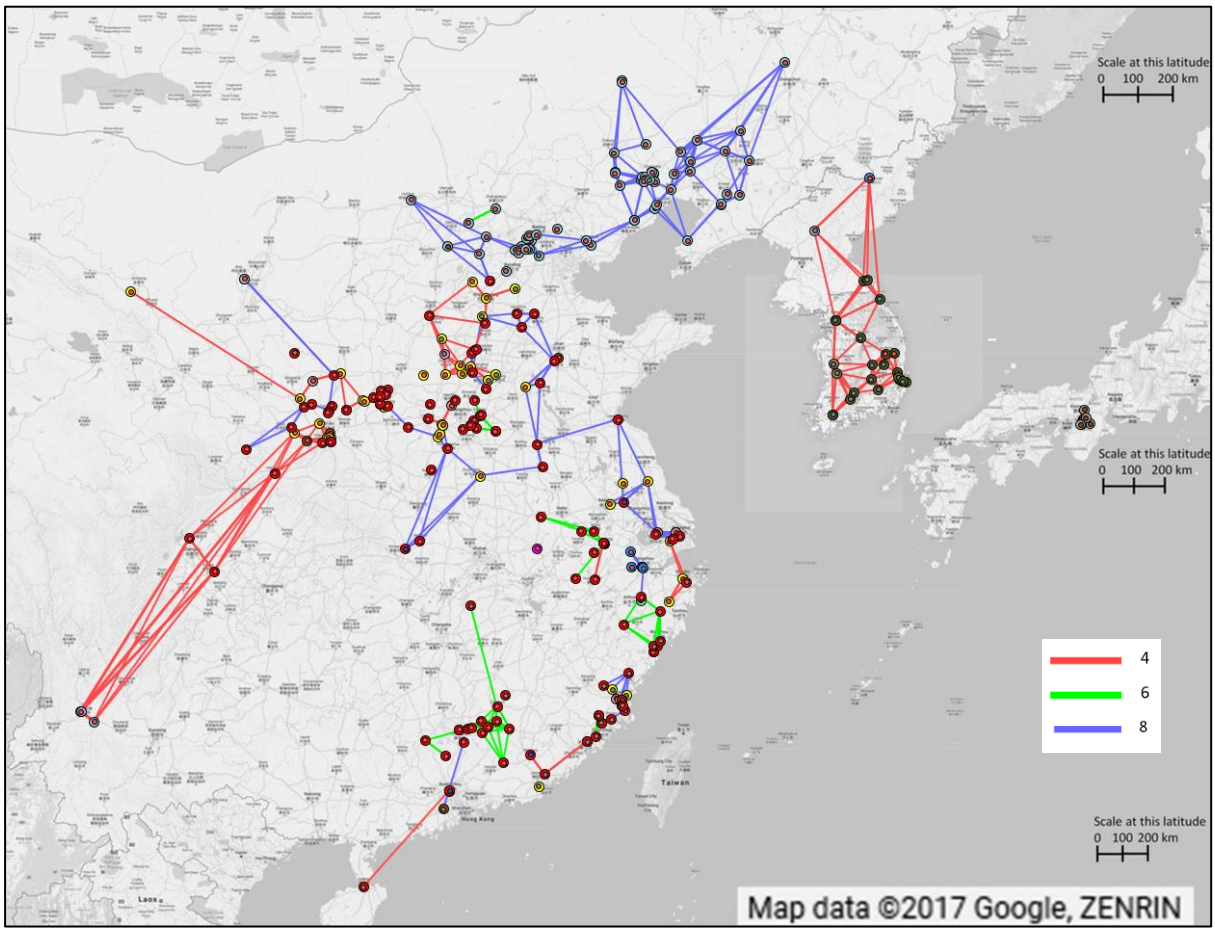

‘Single feature’ map based on ‘number of sides’, filtered to pagodas with a confirmed date pre-907.

Fig. 3.30:



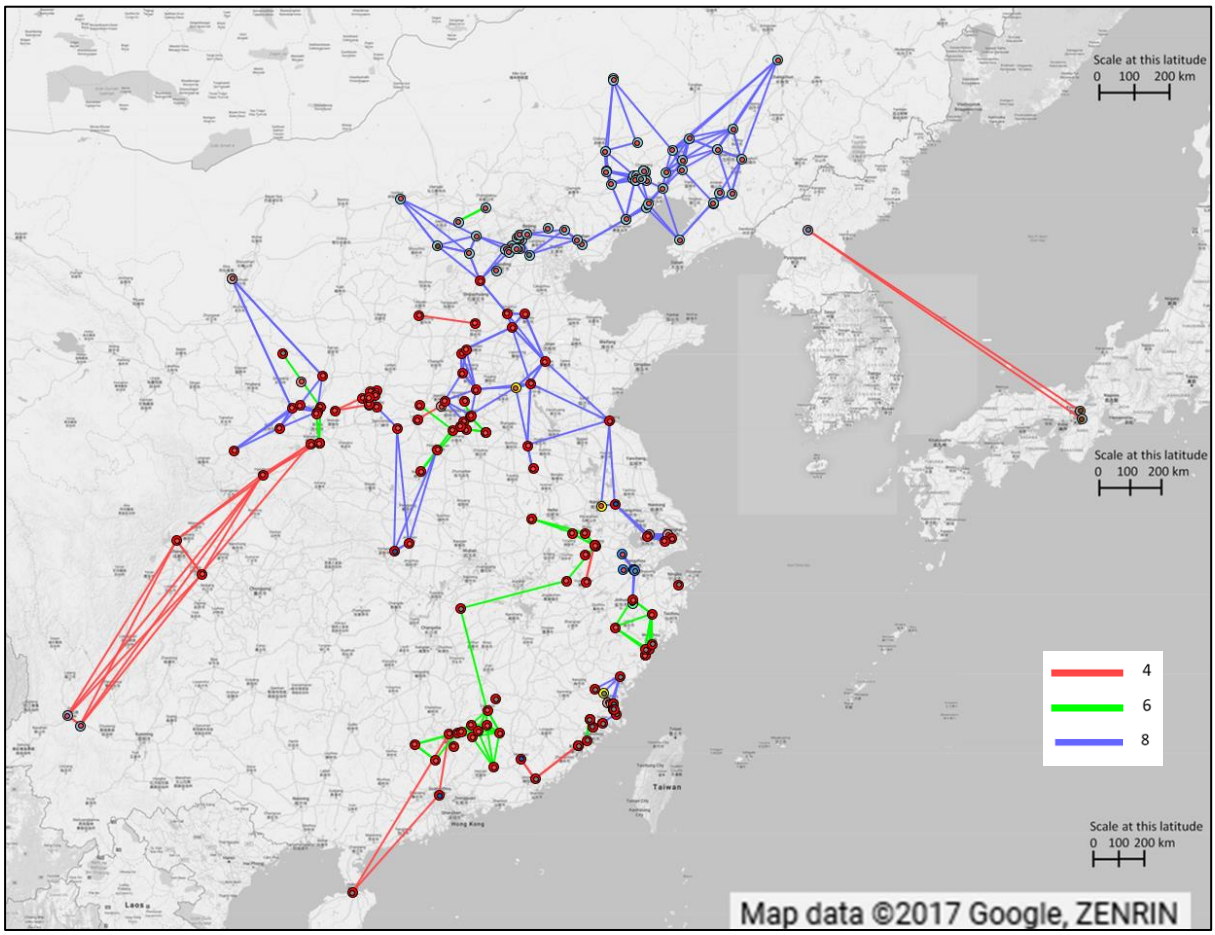

‘Single feature’ map based on ‘number of sides’, filtered to pagodas with a confirmed date pre-1007.

Fig. 3.31:



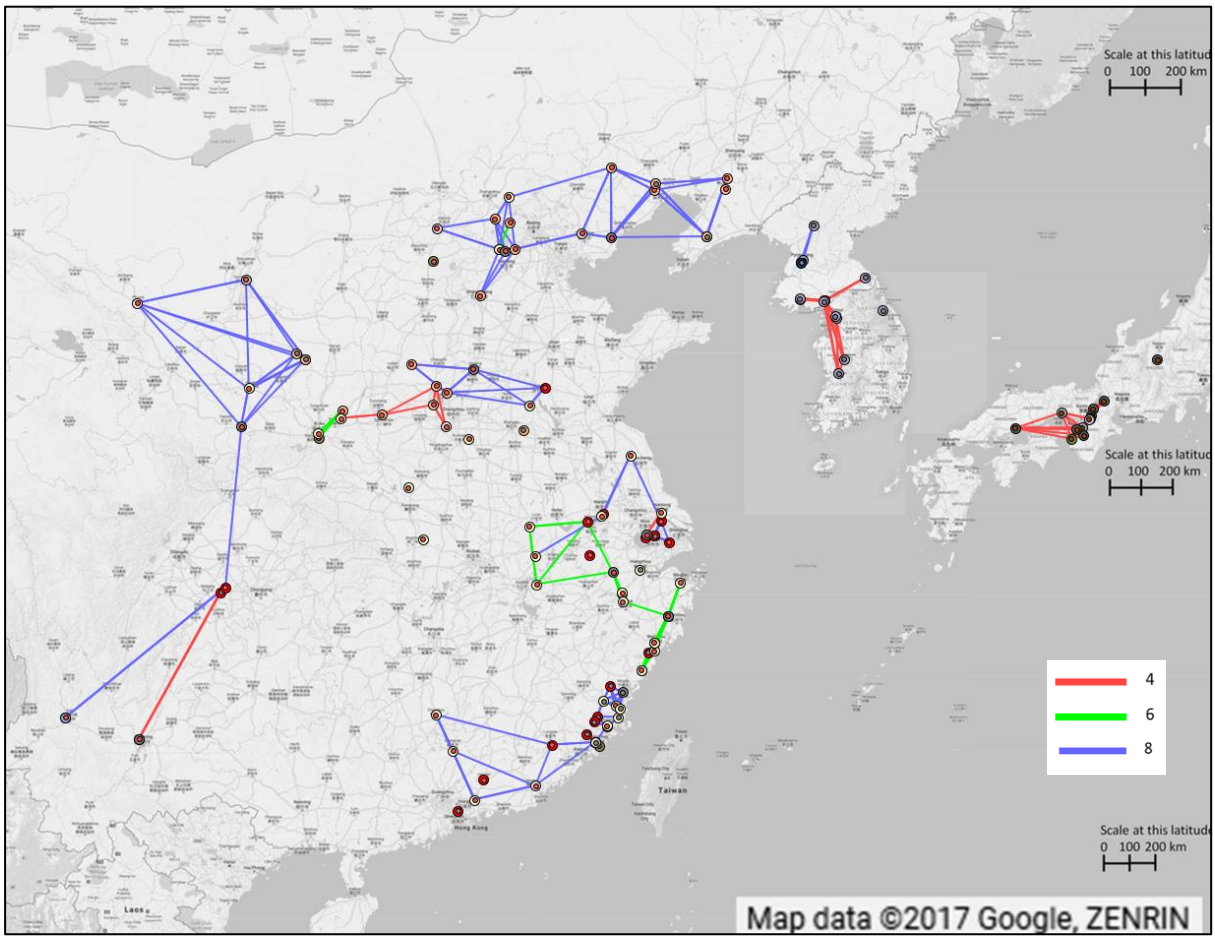

‘Single feature’ map based on ‘number of sides’ filtered to pagodas with a confirmed date pre-1125.

Fig. 3.32:



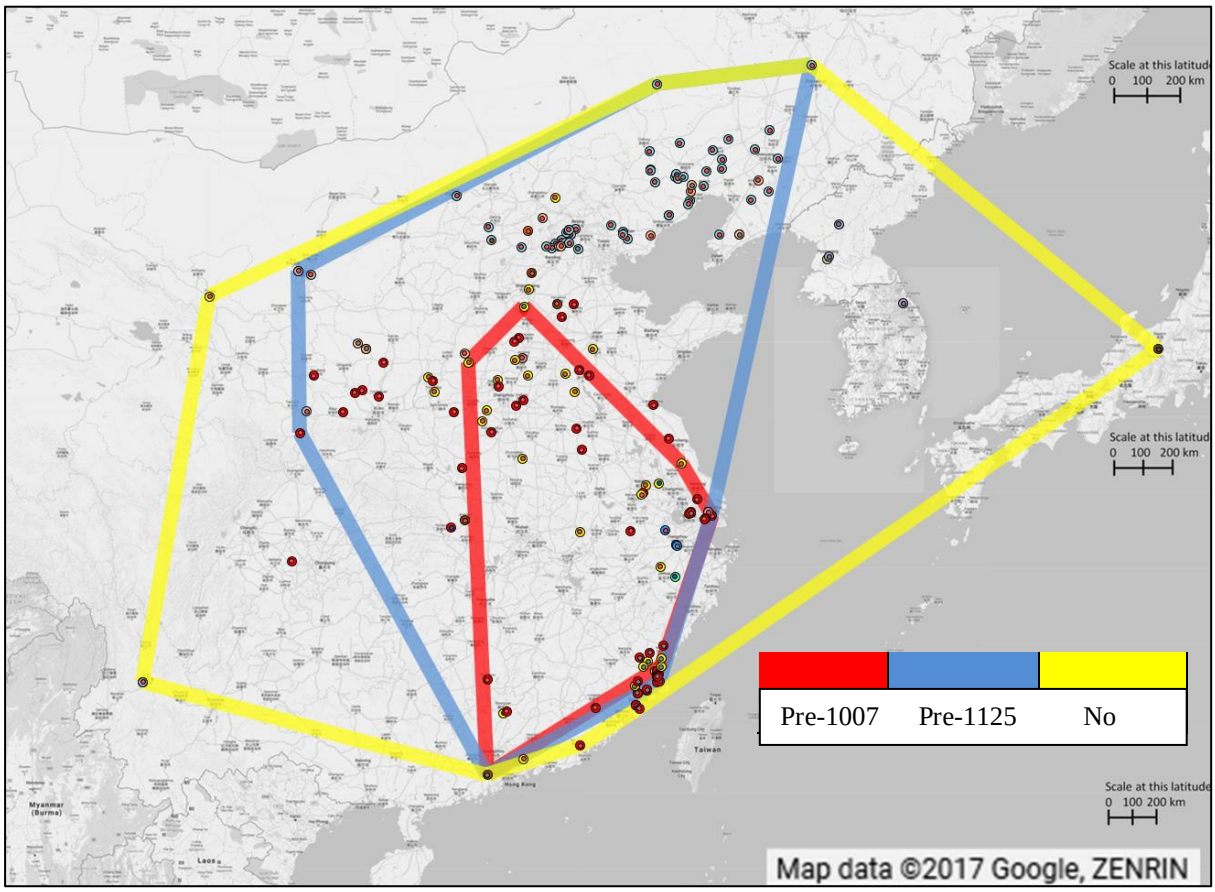

‘Single feature’ map based on ‘number of sides’, filtered to pagodas with a confirmed date 907-1125.

Fig. 3.33:




‘Single feature’ map based on ‘number of sides, filtered to pagodas with a confirmed date post -1125.

Fig. 3.34:

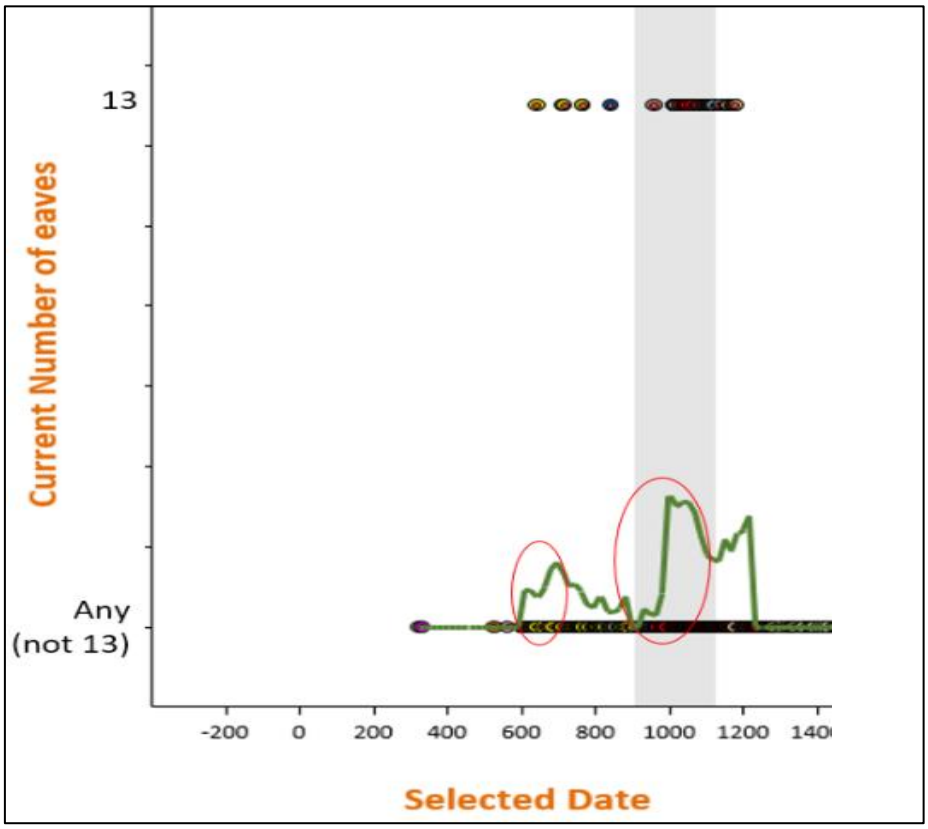



Map created using the 'Venn diagram' function that demonstrates the geographical extent of octagonal pagodas in different periods.

Fig. 3.35:

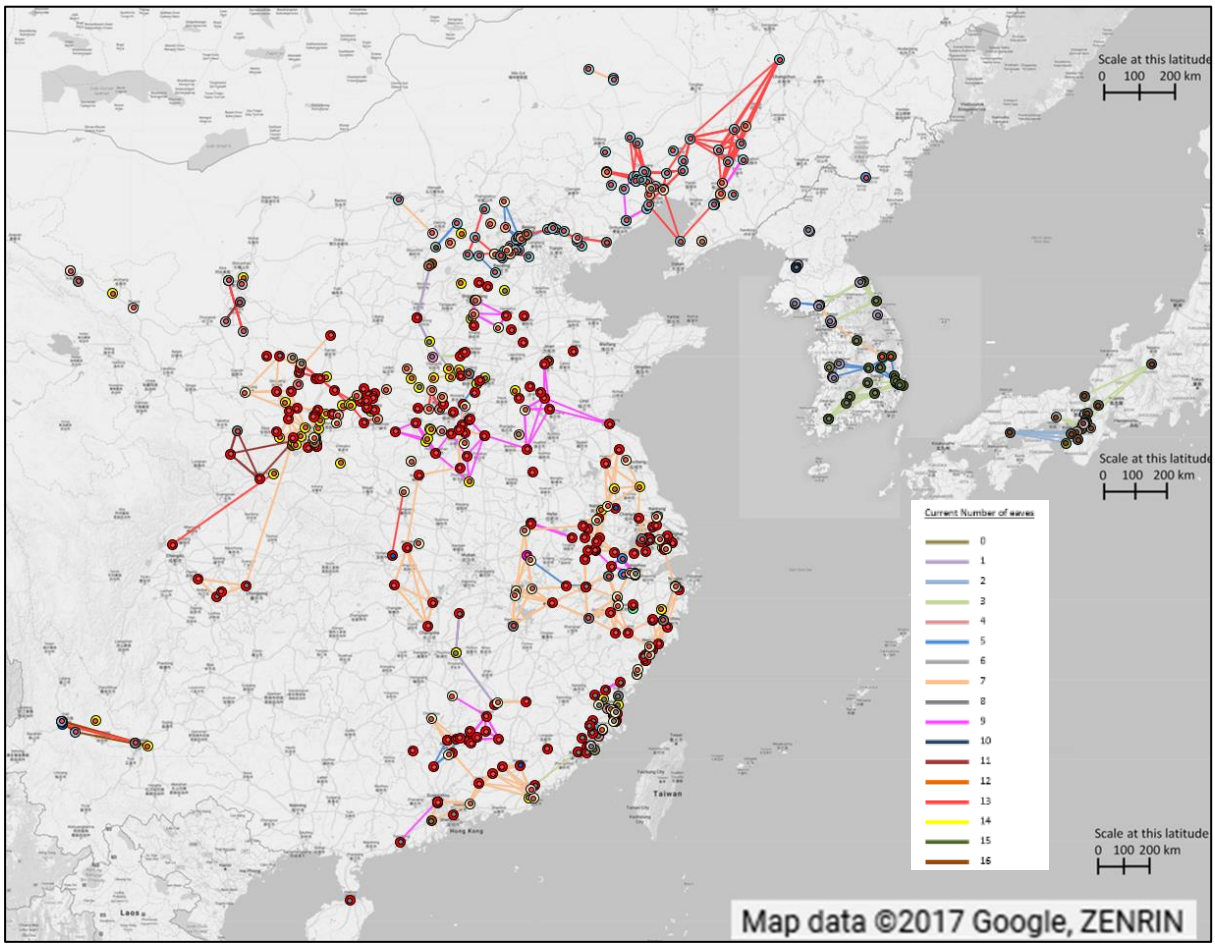
Trigram on the southern face of the Liaoyang White Pagoda (Dugdale 2015).

Fig. 3.36:



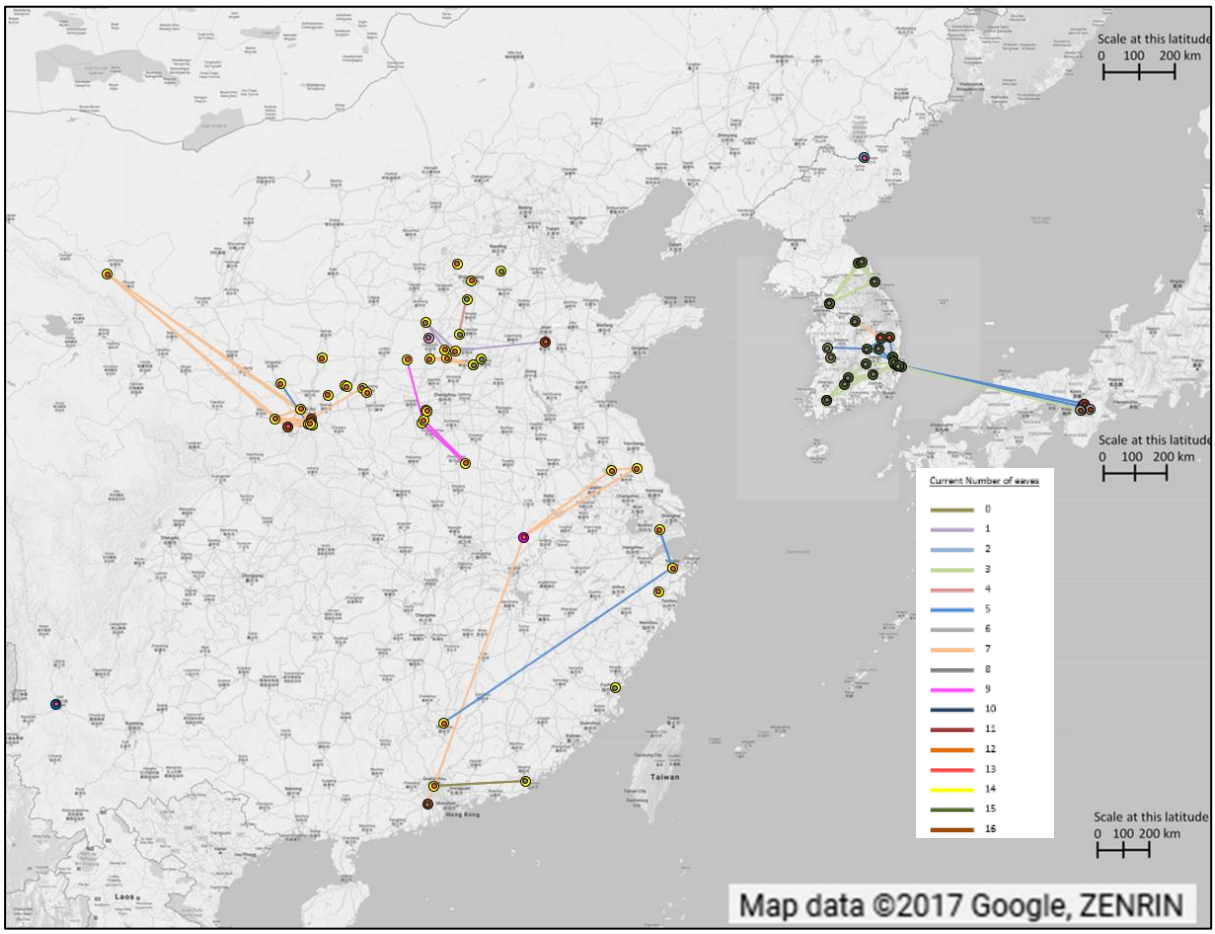

Scatter chart demonstrating the trend for the use of thirteen eaves in pagoda design over time based on the mean date of construction for the current structure. Periods with a trend for thirteen eaves have been highlighted in red.

Fig. 3.37:



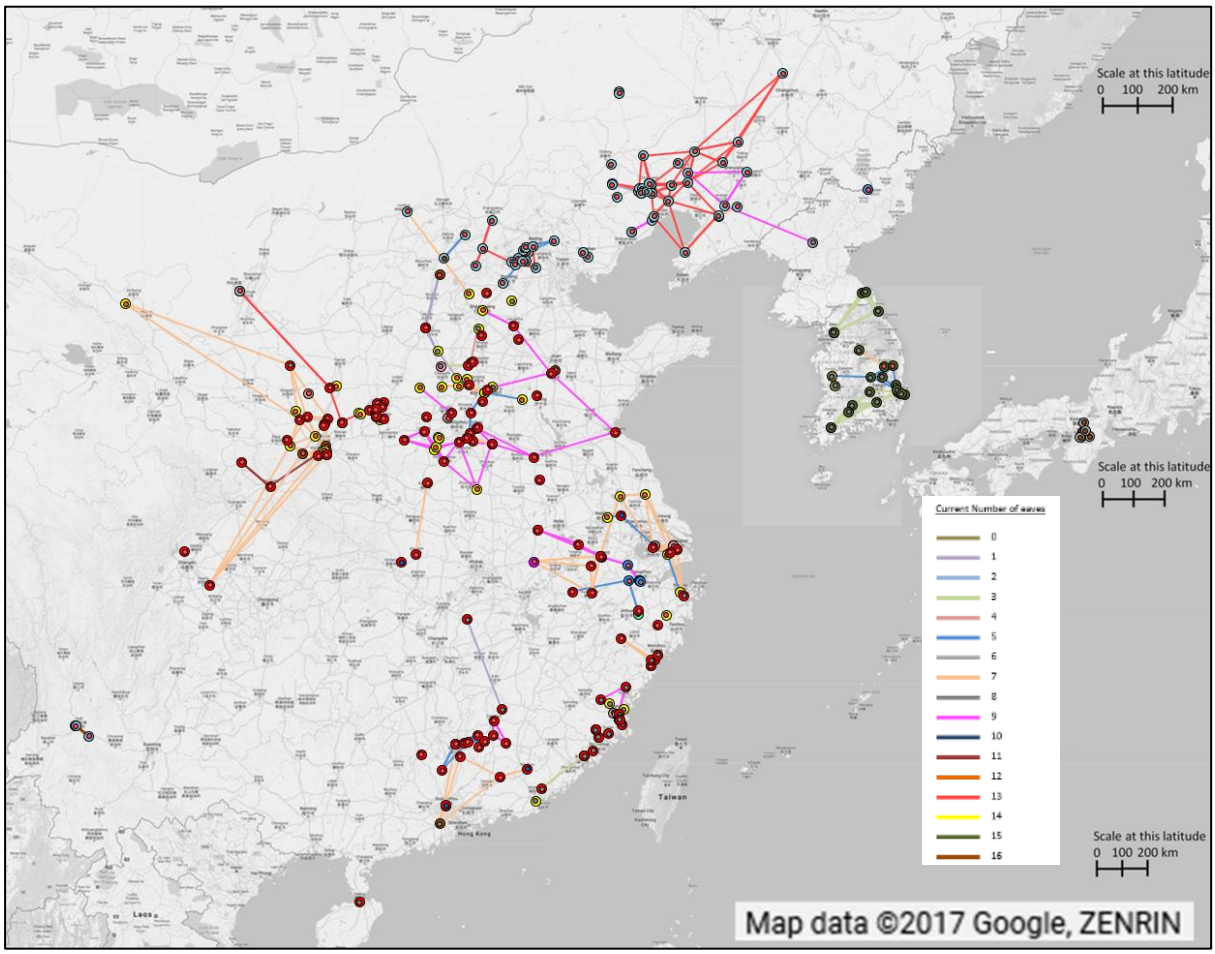

‘Single feature’ map based on ‘number of eaves’.

Fig. 3.38:



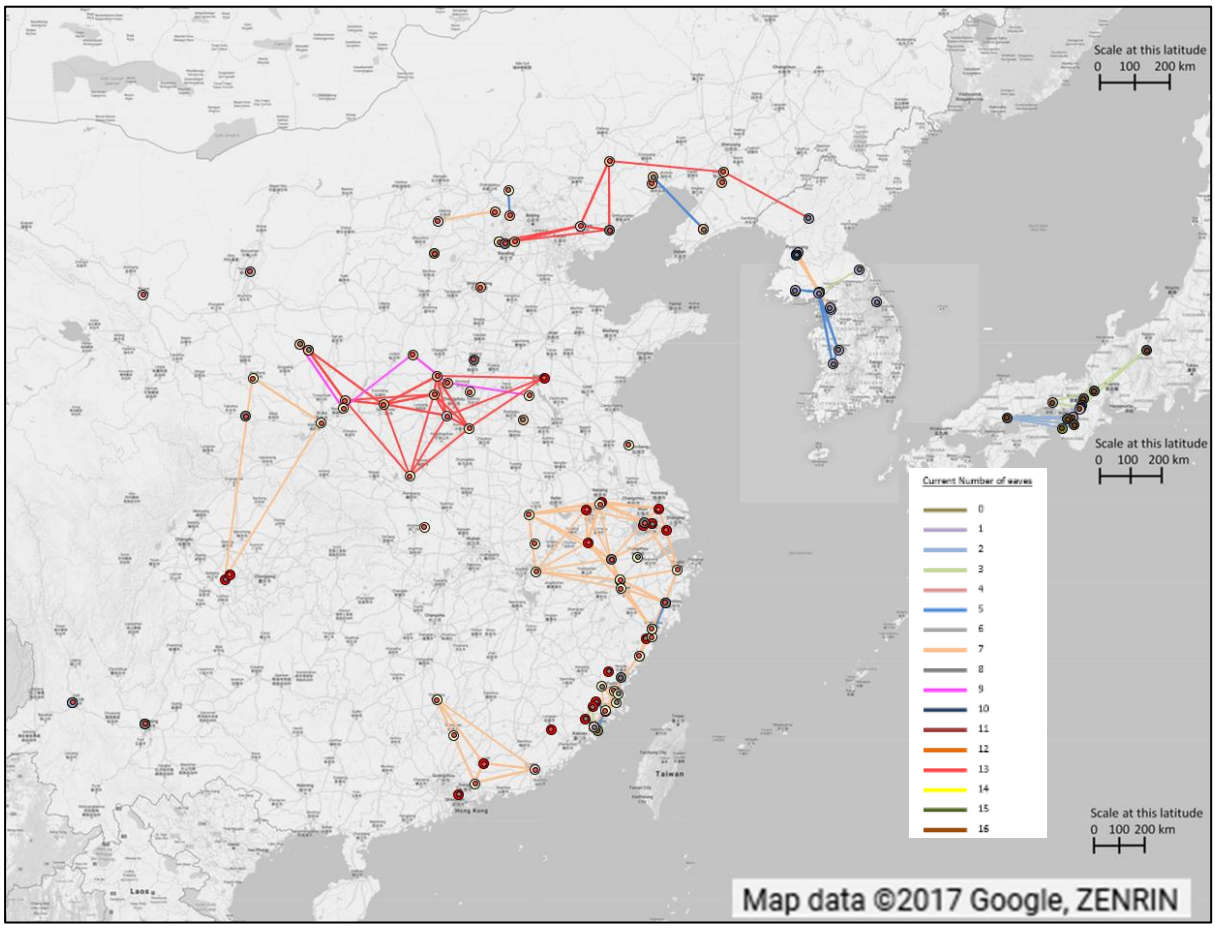

‘Single feature’ map based on ‘number of eaves’, filtered to pagodas with a confirmed date pre-1007.

Fig. 3.39:



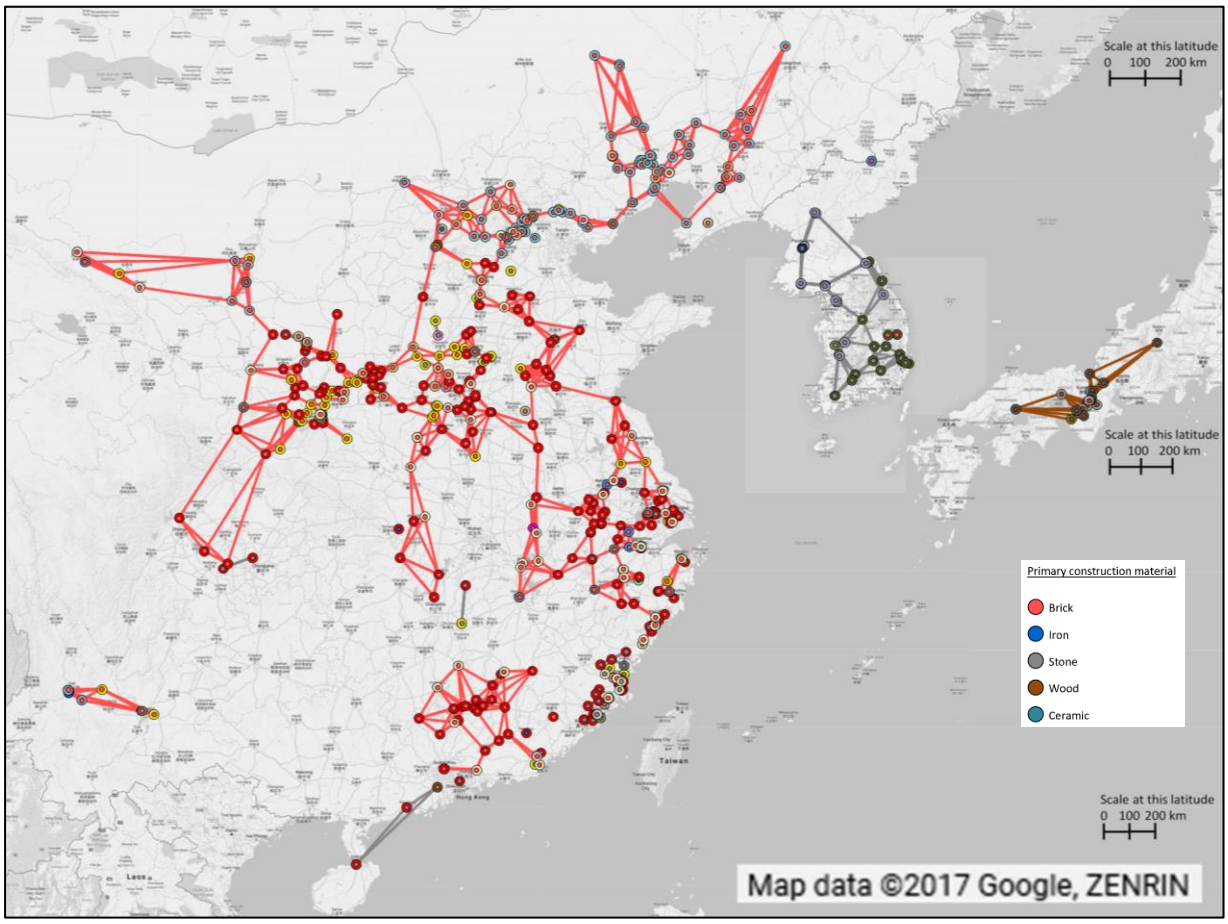

'Single feature' map based on 'number of eaves', filtered to pagodas with a confirmed date pre-1125.

Fig. 3.40:



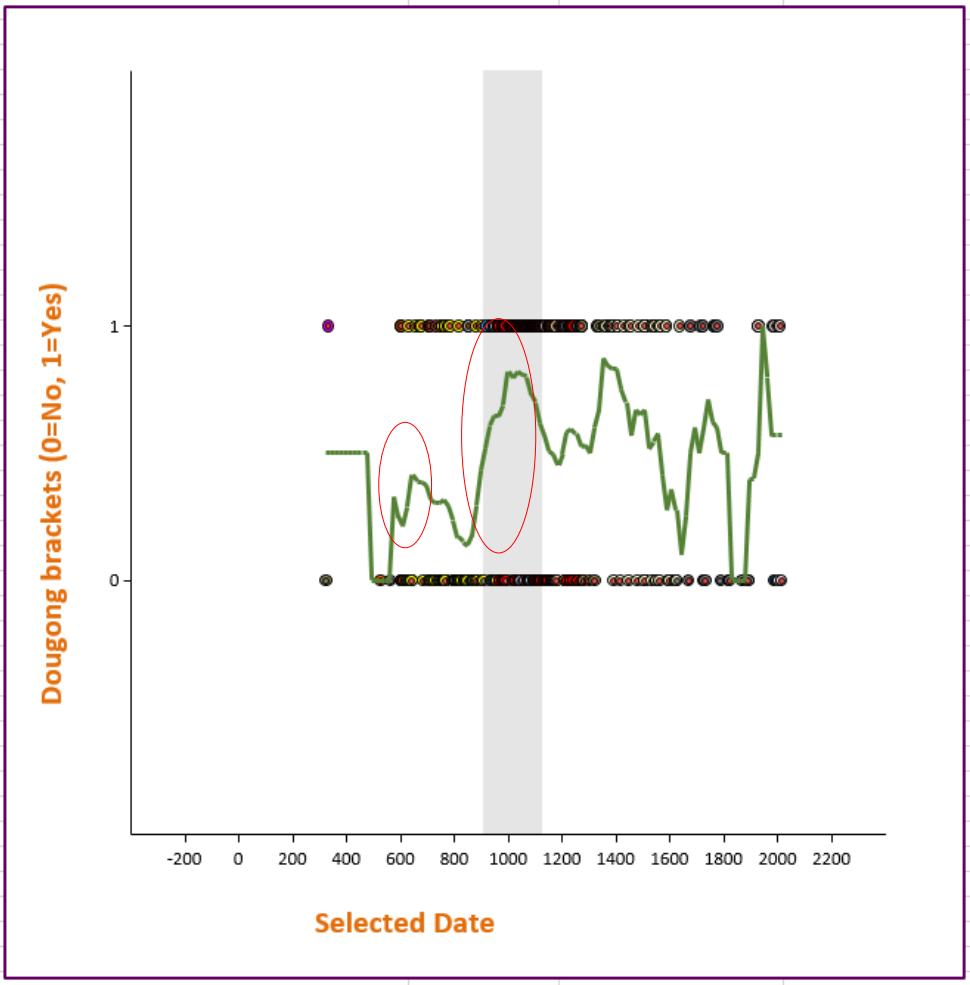

‘Single feature’ map based on ‘number of eaves’, filtered to pagodas with a confirmed date post-1125.

Fig. 3.41:



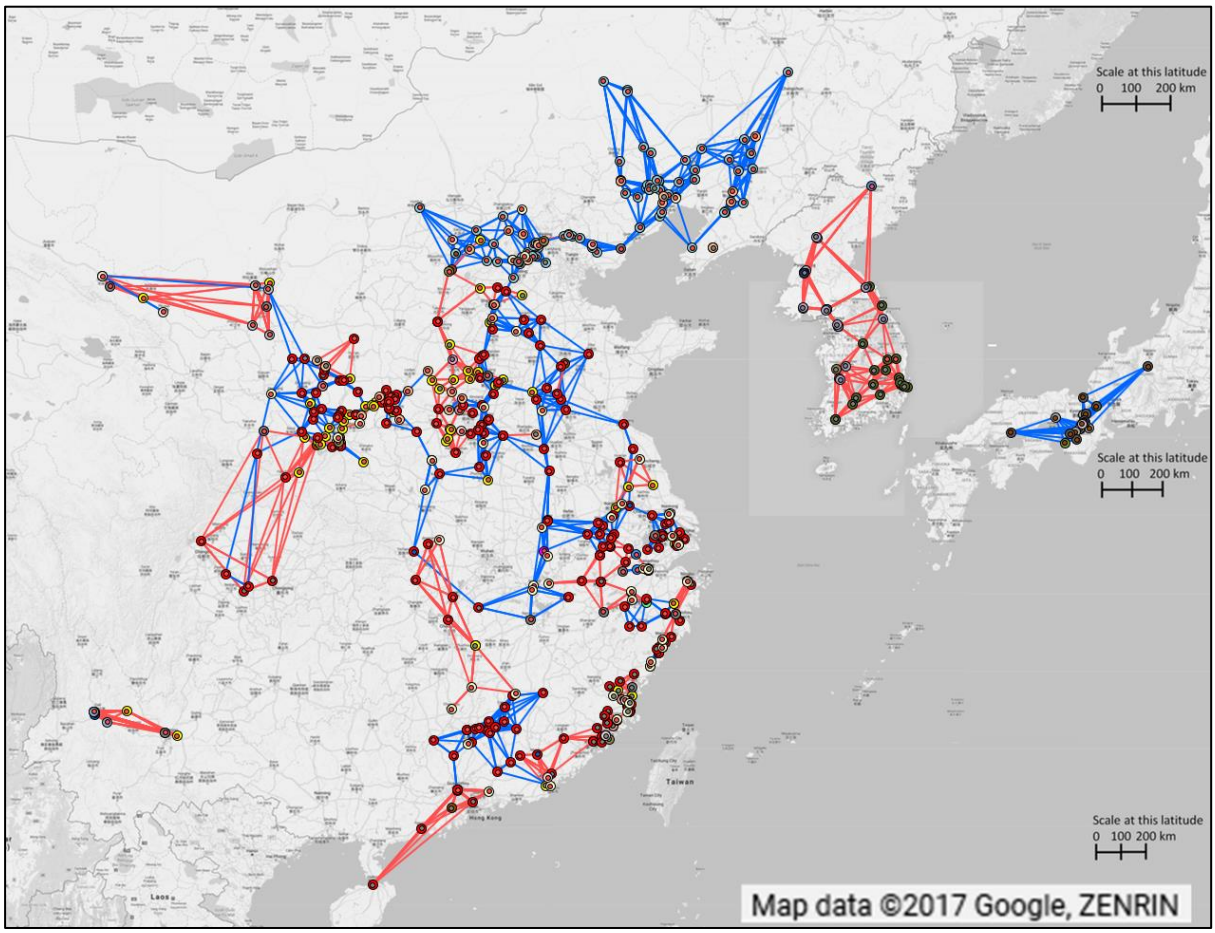

‘Single feature’ map based on ‘primary construction material’.

Fig. 3.42:



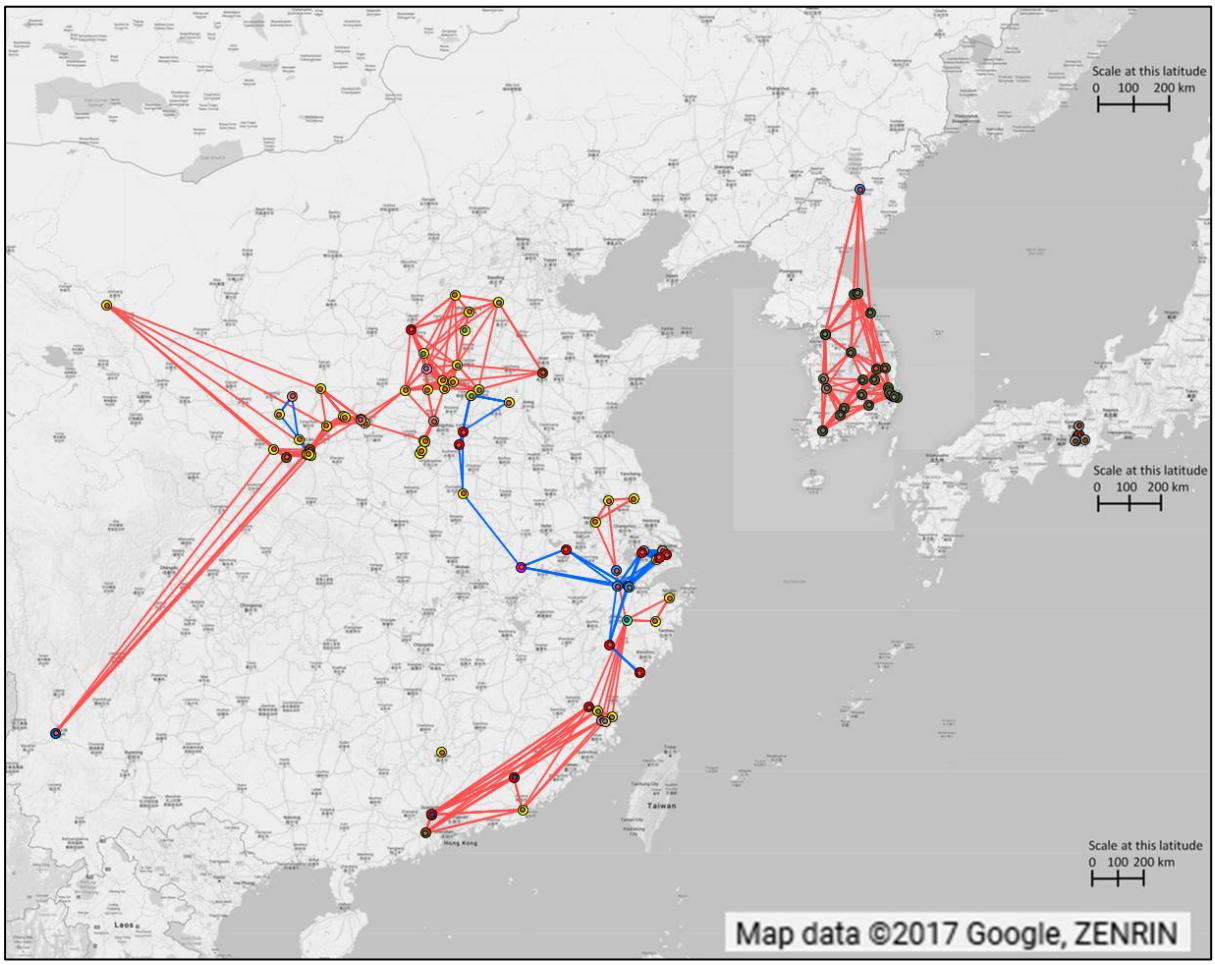

Scatter chart demonstrating the trend for the presence of '*dougong* brackets' in pagoda design over time based on the mean date of construction for the current structure.

Fig. 3.43:



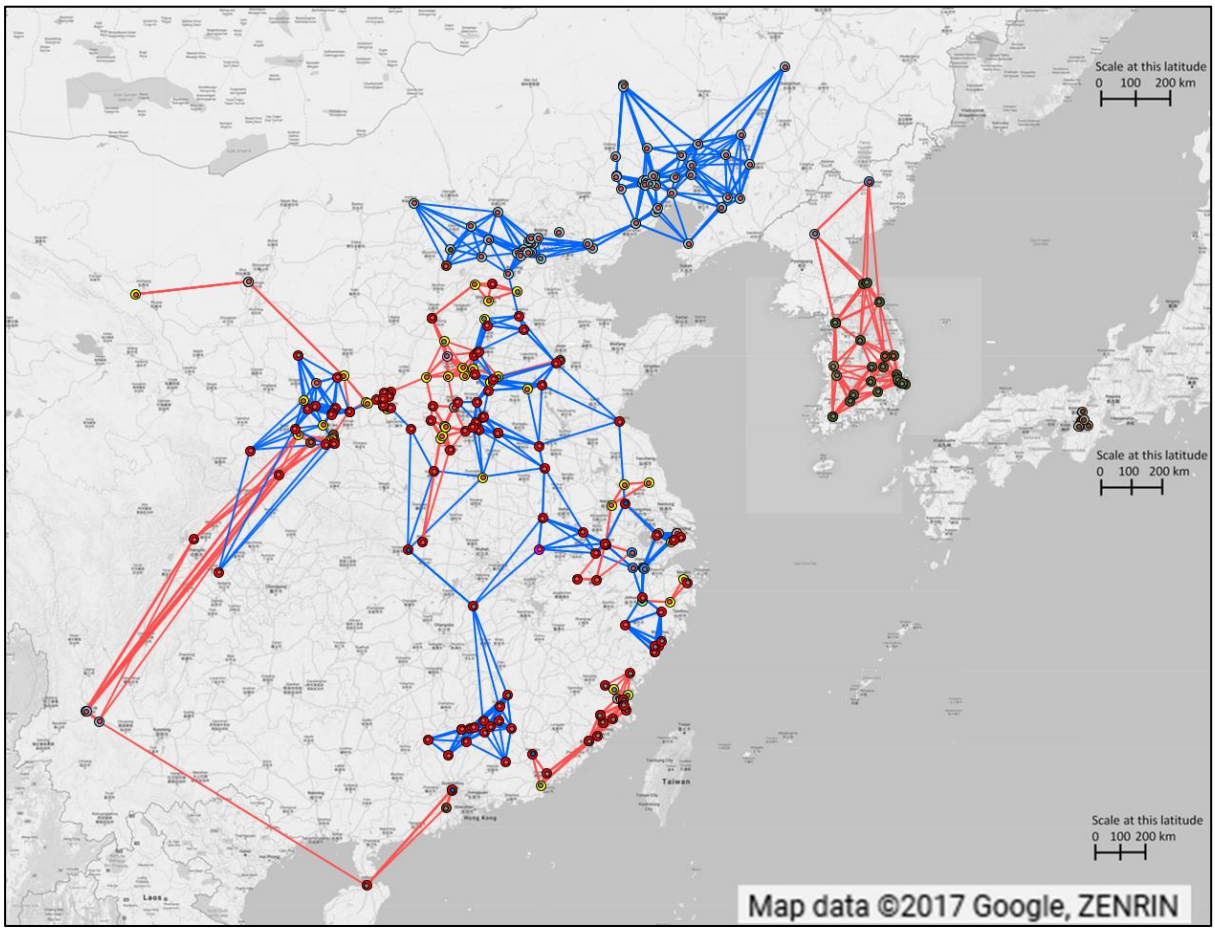

Single feature map of '*dougong* brackets'.

Fig. 3.44:



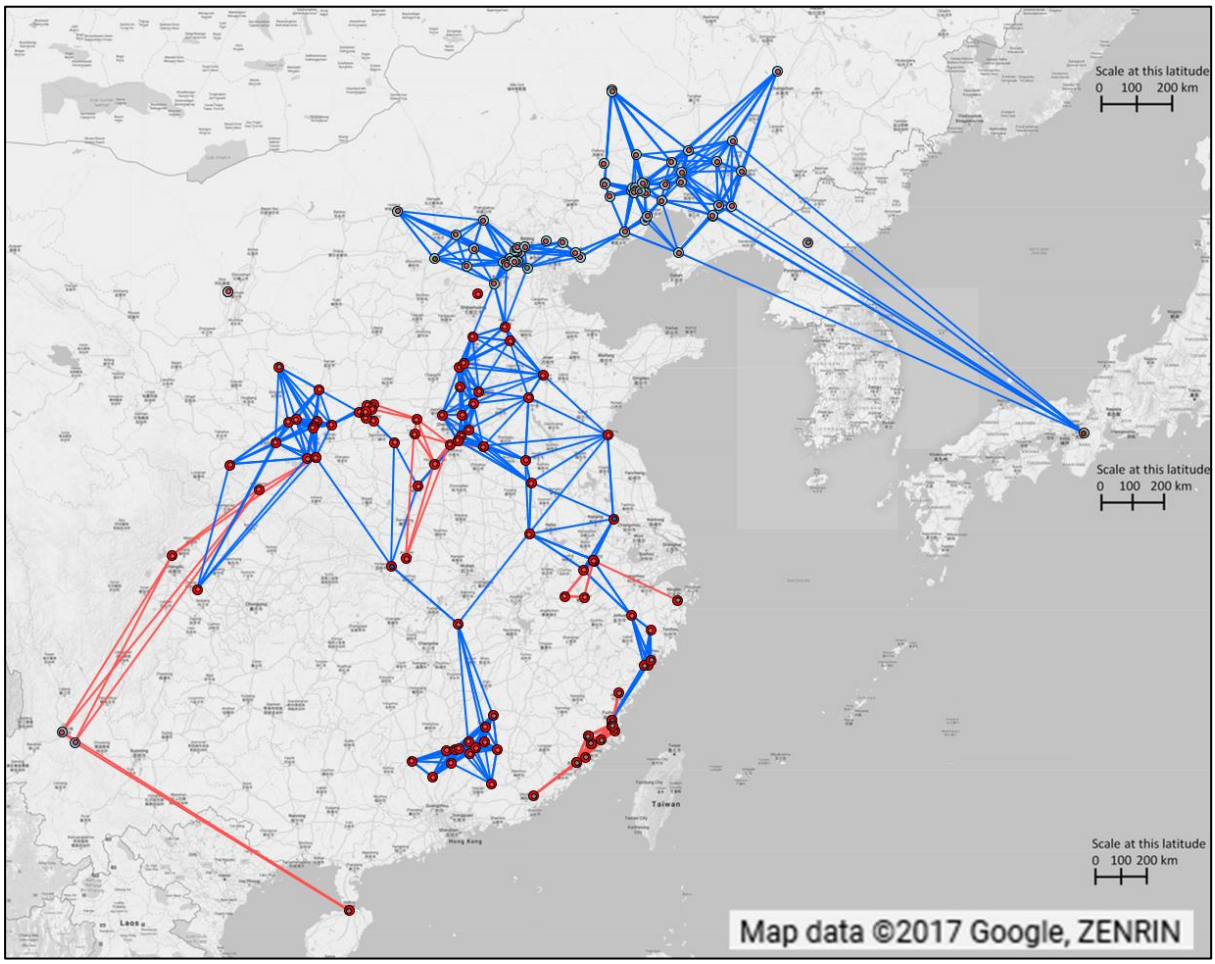

Single feature map of '*dougong* brackets', filtered to pagodas with a confirmed date pre-1007.

Fig. 3.45:



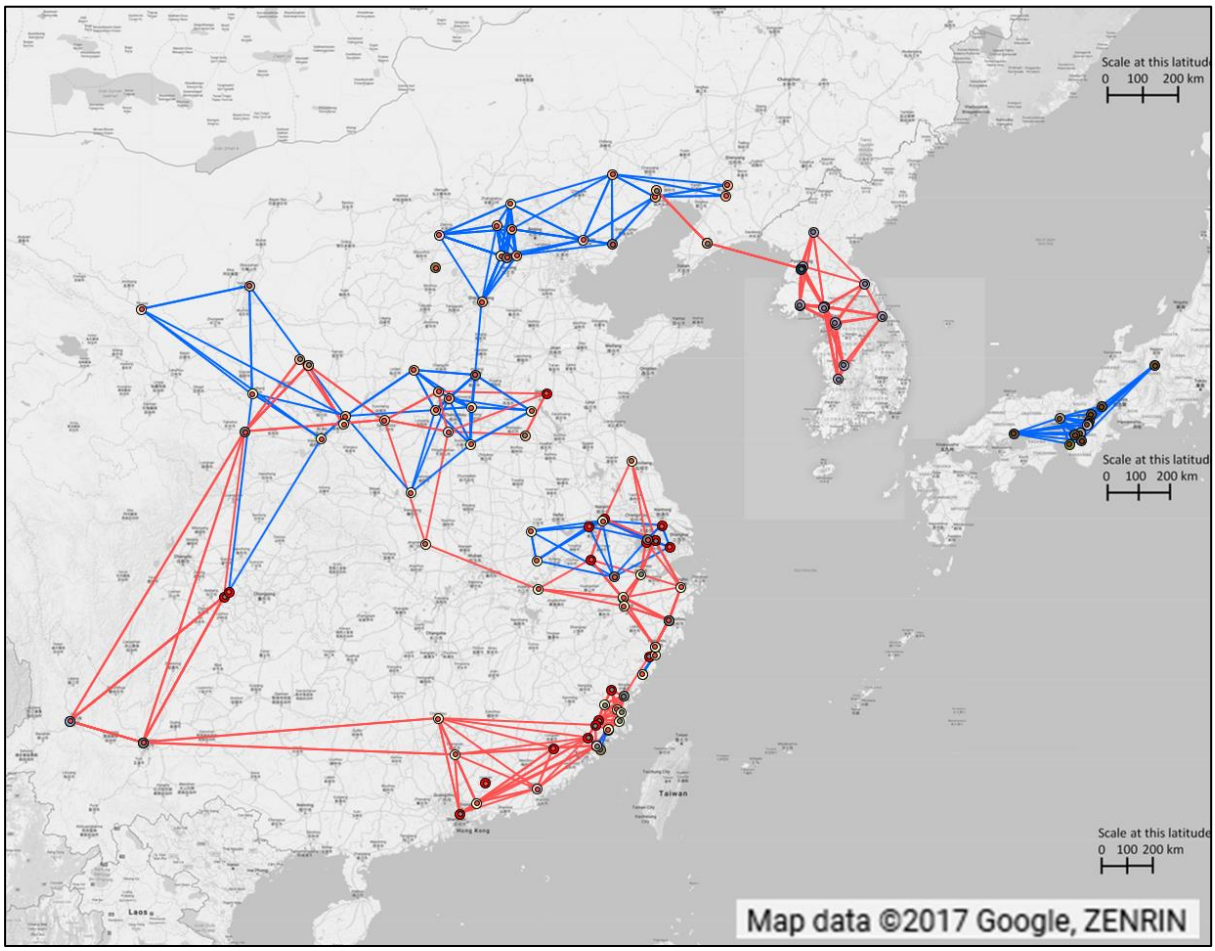

Single feature map of *'dougong* brackets', filtered to pagodas with a confirmed date pre-1125.

Fig. 3.46:



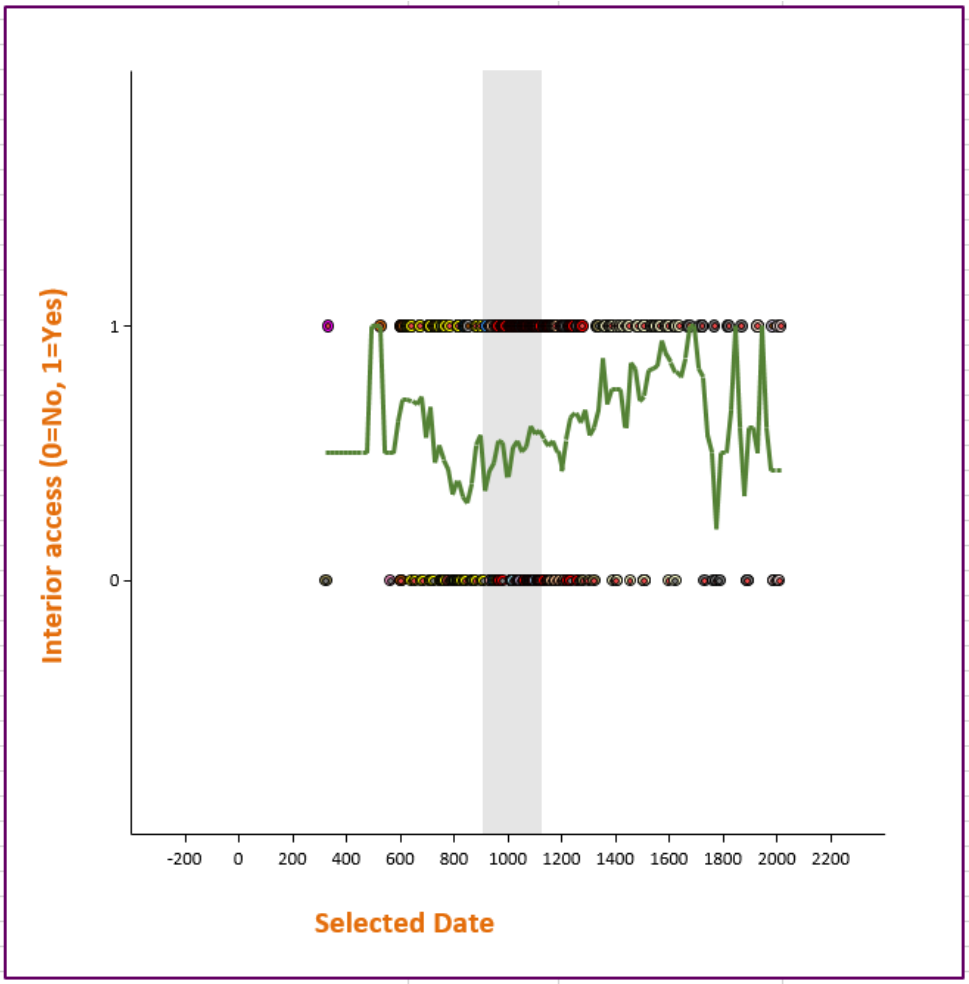

Single feature map of '*dougong* brackets', filtered to pagodas with a confirmed date 1007-1125.

Fig. 3.47:



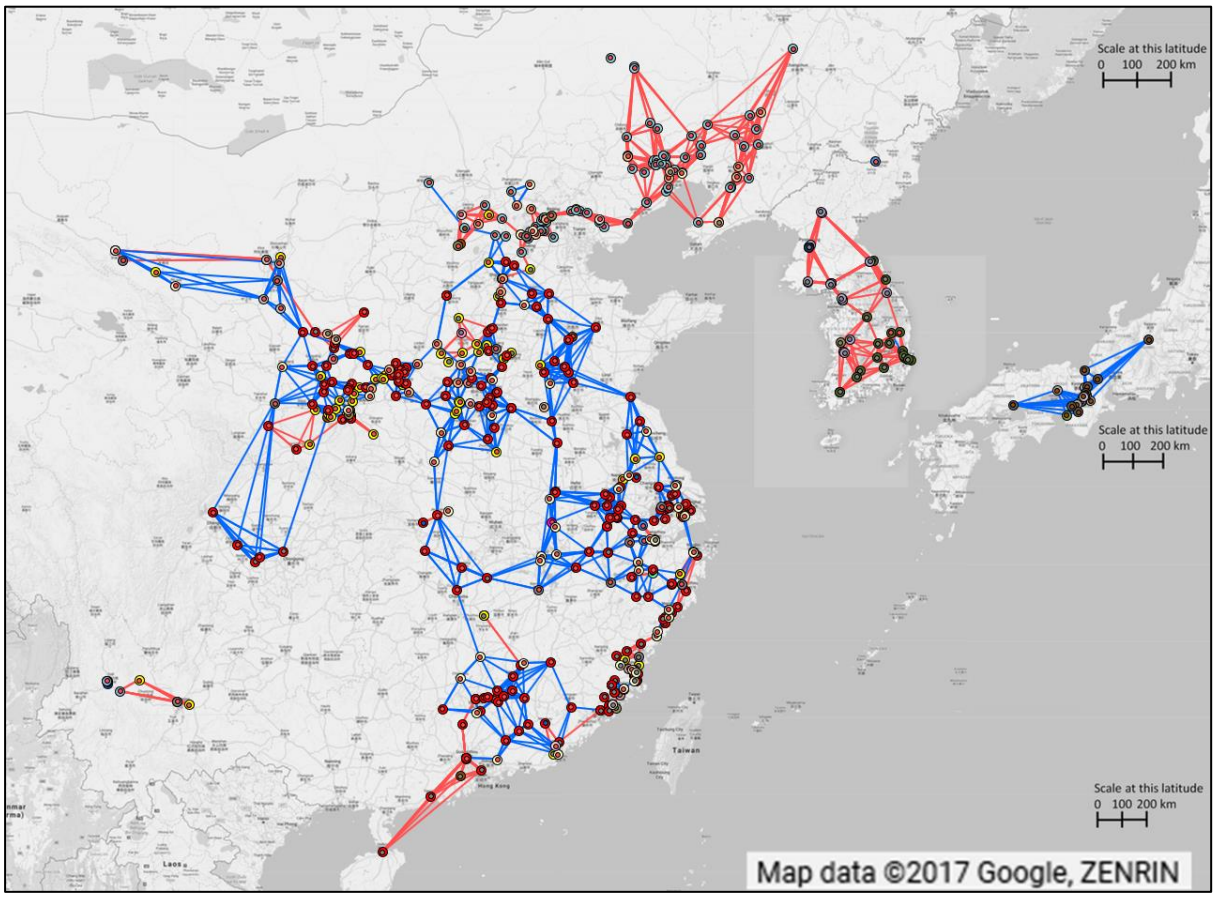

Single feature map of '*dougong* brackets', filtered to pagodas with a confirmed date post-1125.

Fig. 3.48:



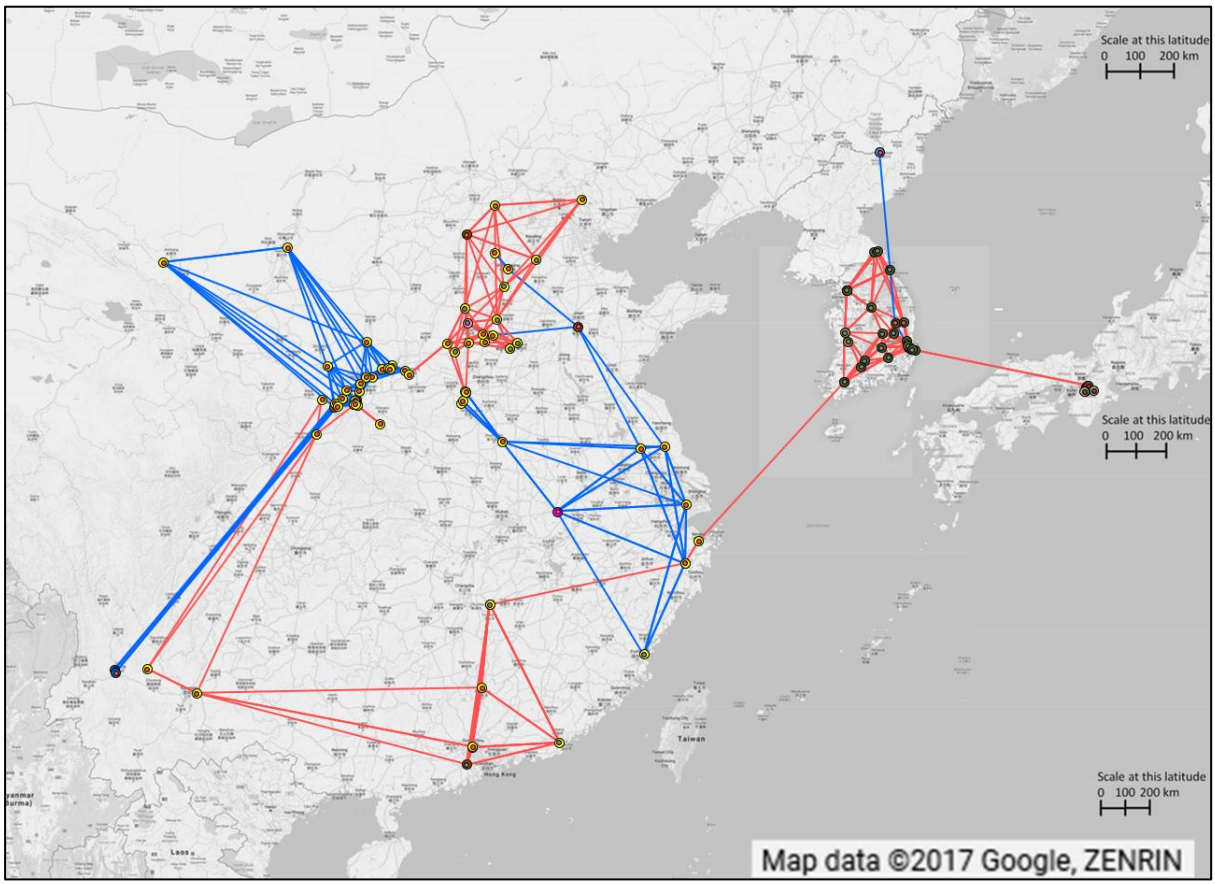

Scatter chart demonstrating the trend for 'interior access' in pagoda design over time based on the mean date of construction for the current structure.

Fig. 3.49:



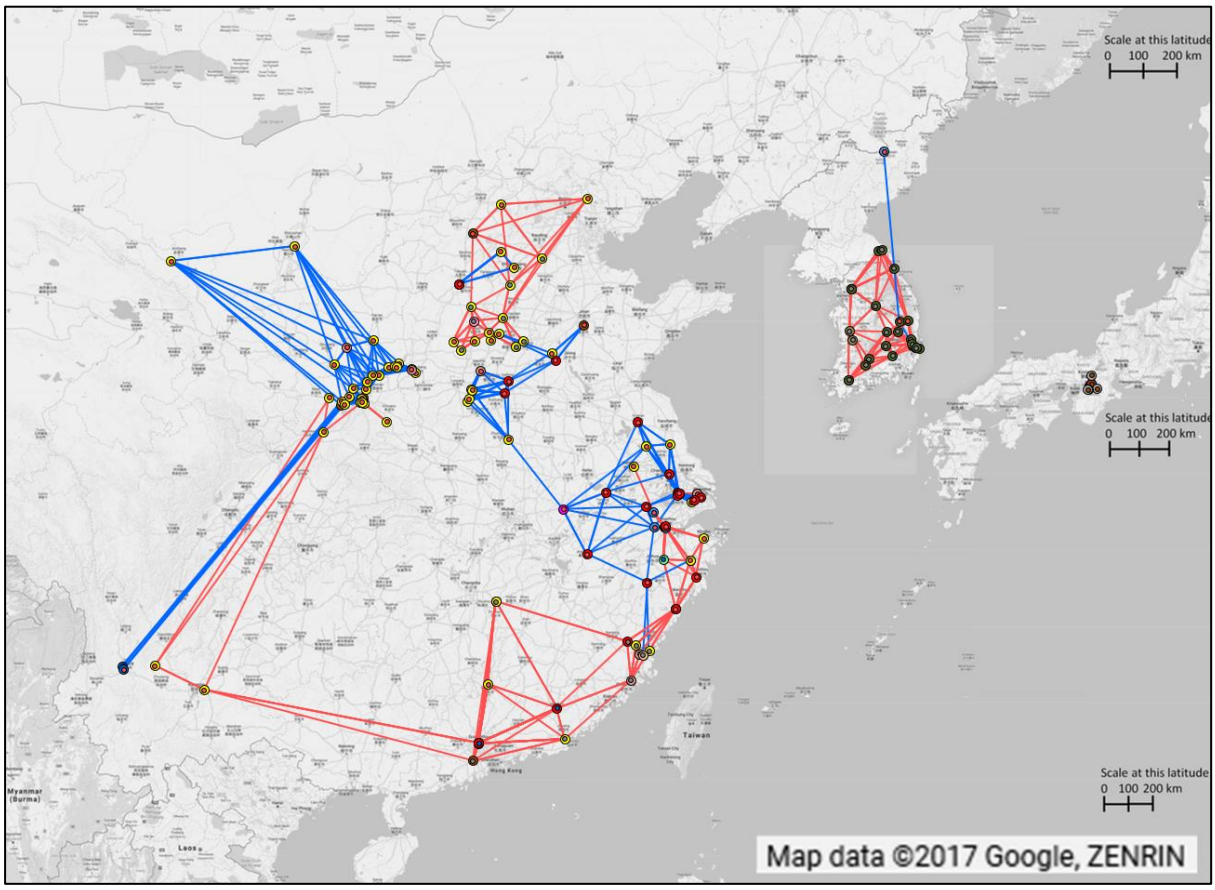

Single feature map for ‘interior access’.

Fig. 3.50:



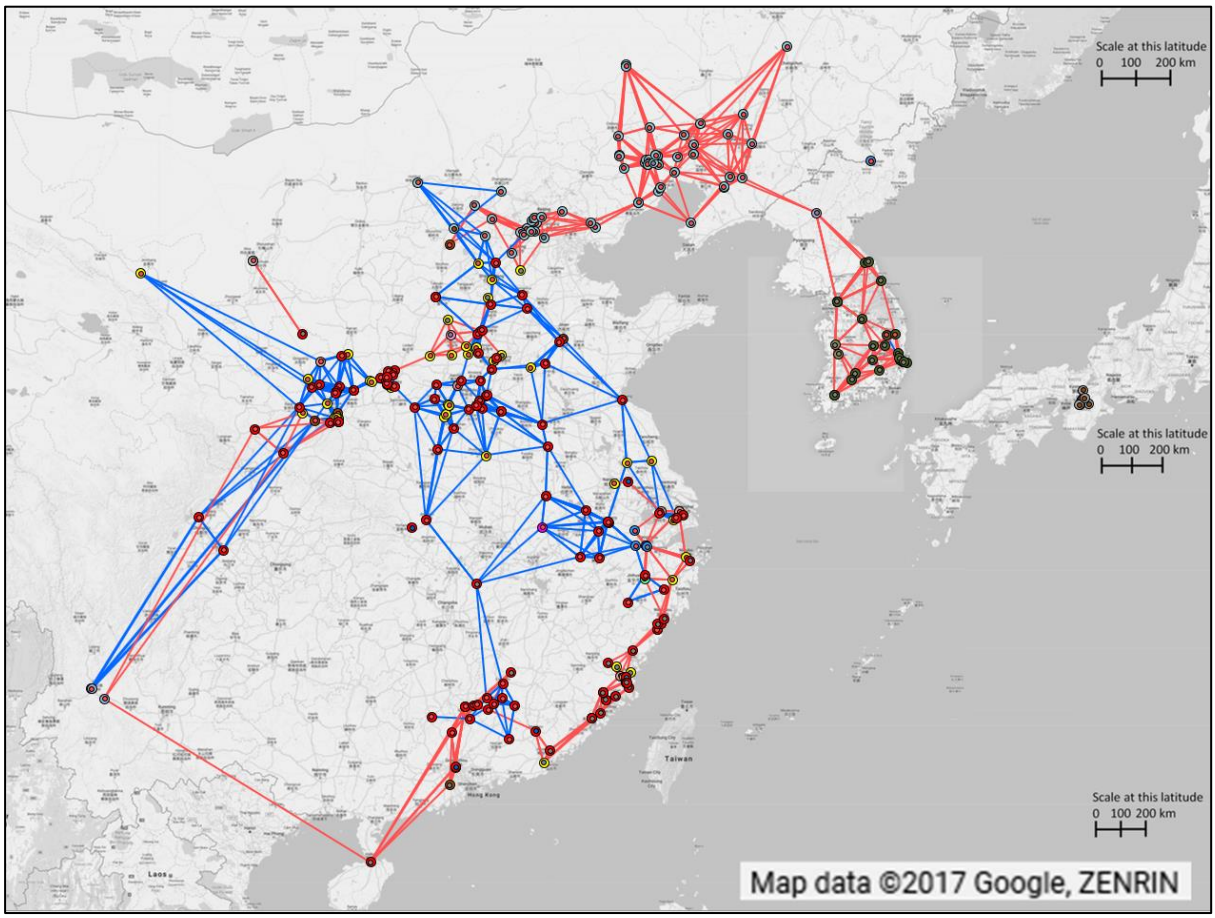

Single feature map for ‘interior access’, filtered to pagodas with a confirmed date pre-907.

Fig. 3.51:



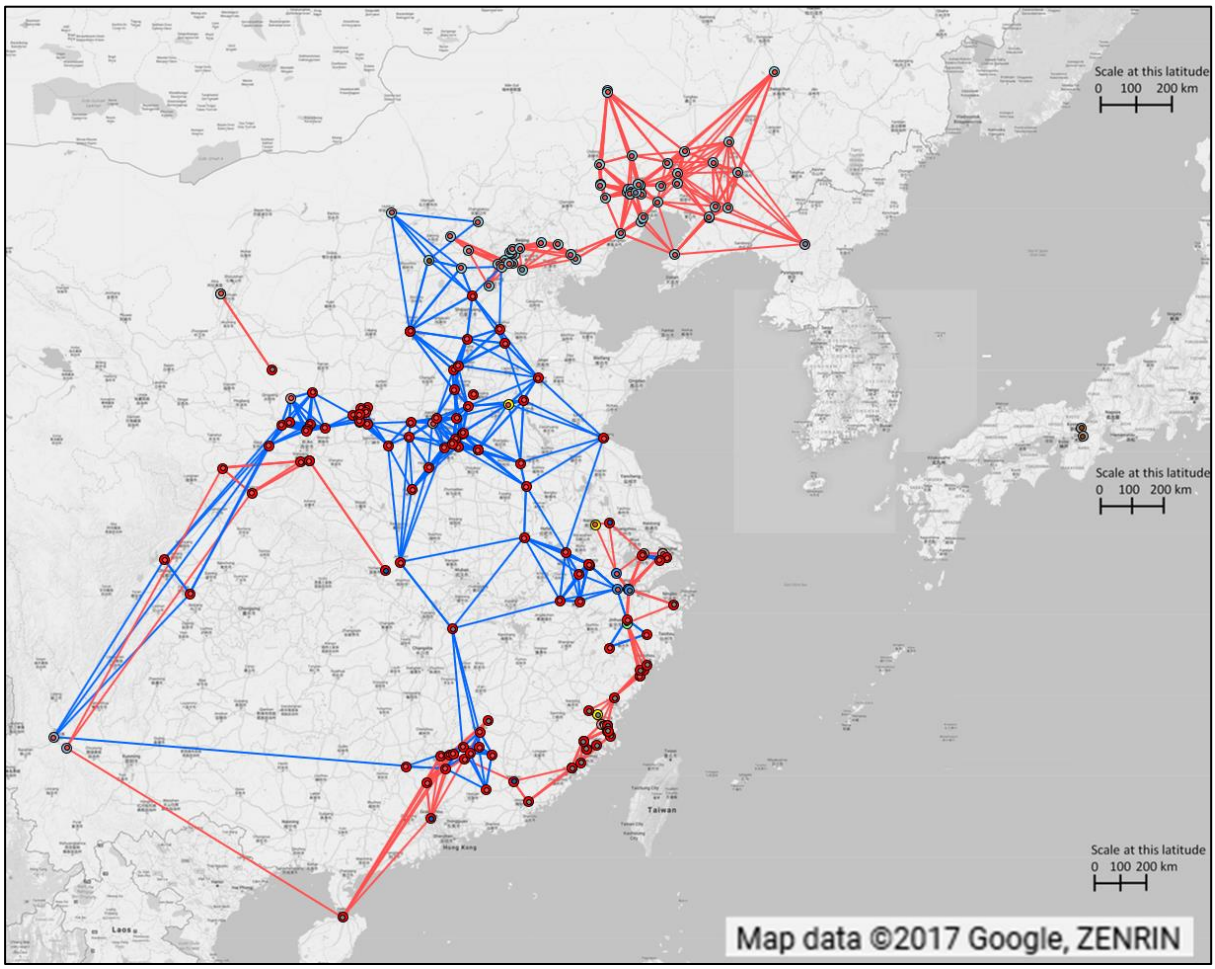

Single feature map of ‘interior access', filtered to pagodas with a confirmed date pre-1007.

Fig. 3.52:



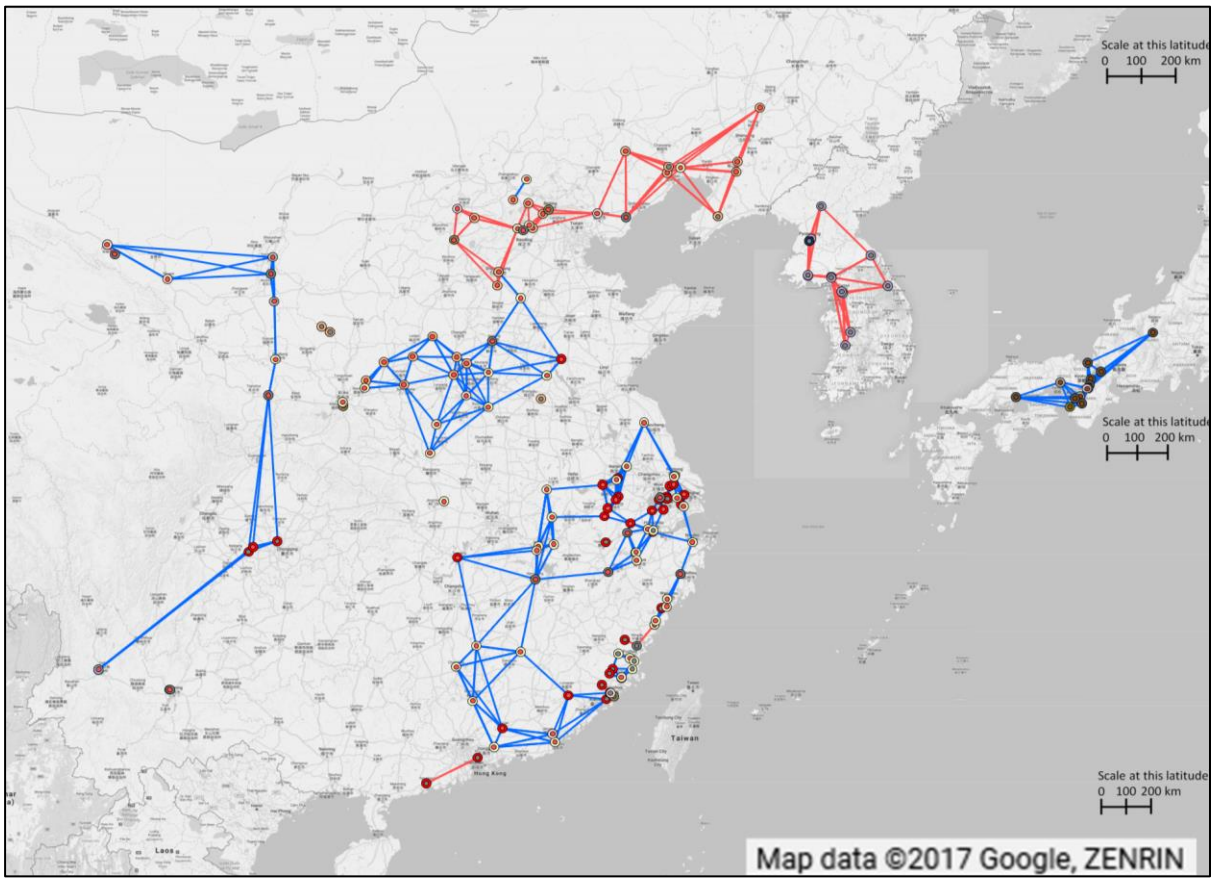

Single feature map of 'interior access', filtered to pagodas with a confirmed date pre-1125.

Fig. 3.53:



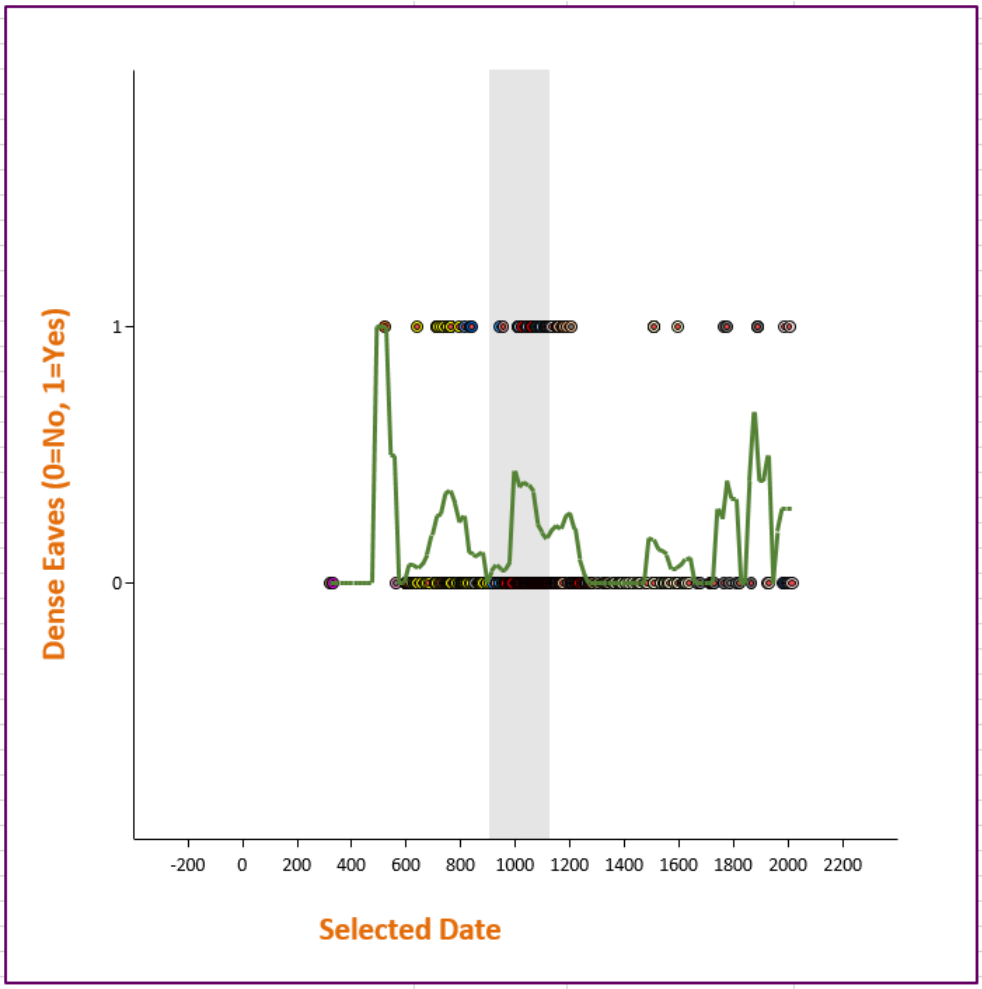

Single feature map of 'interior access', filtered to pagodas with a confirmed date 907-1125.

Fig. 3.54:



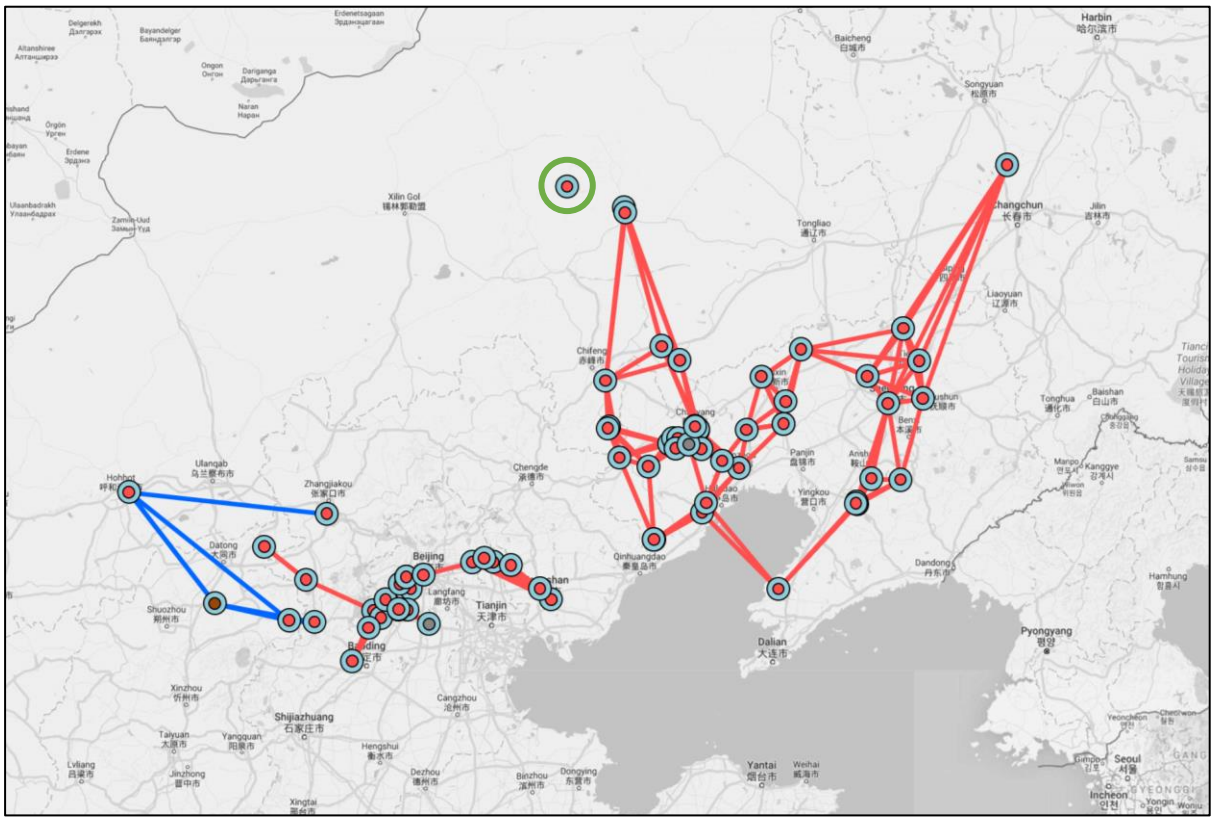

Single feature of 'interior access', filtered to pagodas with a confirmed date post-1125.

Fig. 3.55:



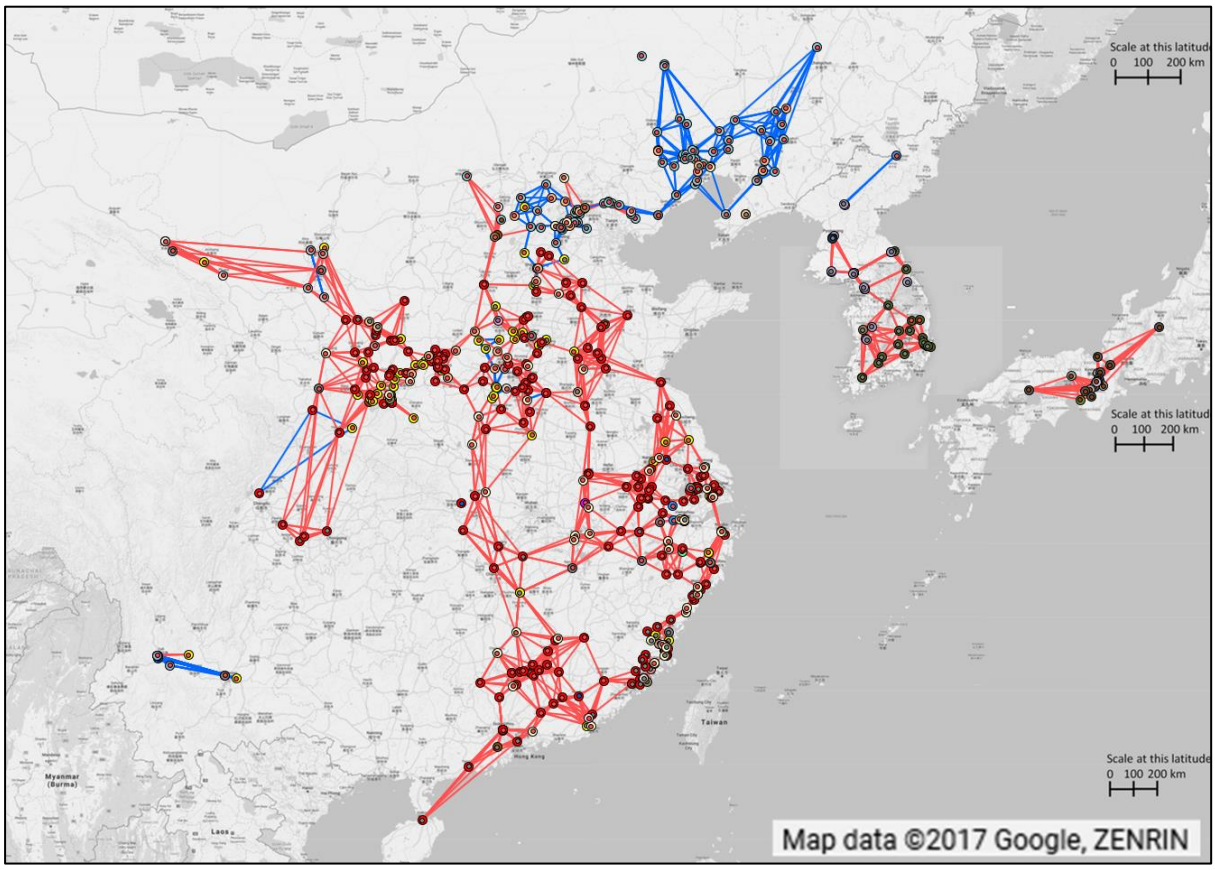

Scatter chart demonstrating the trend for ‘dense eaves’ in pagoda design over time based on the mean date of construction for the current structure.

Fig. 3.56:



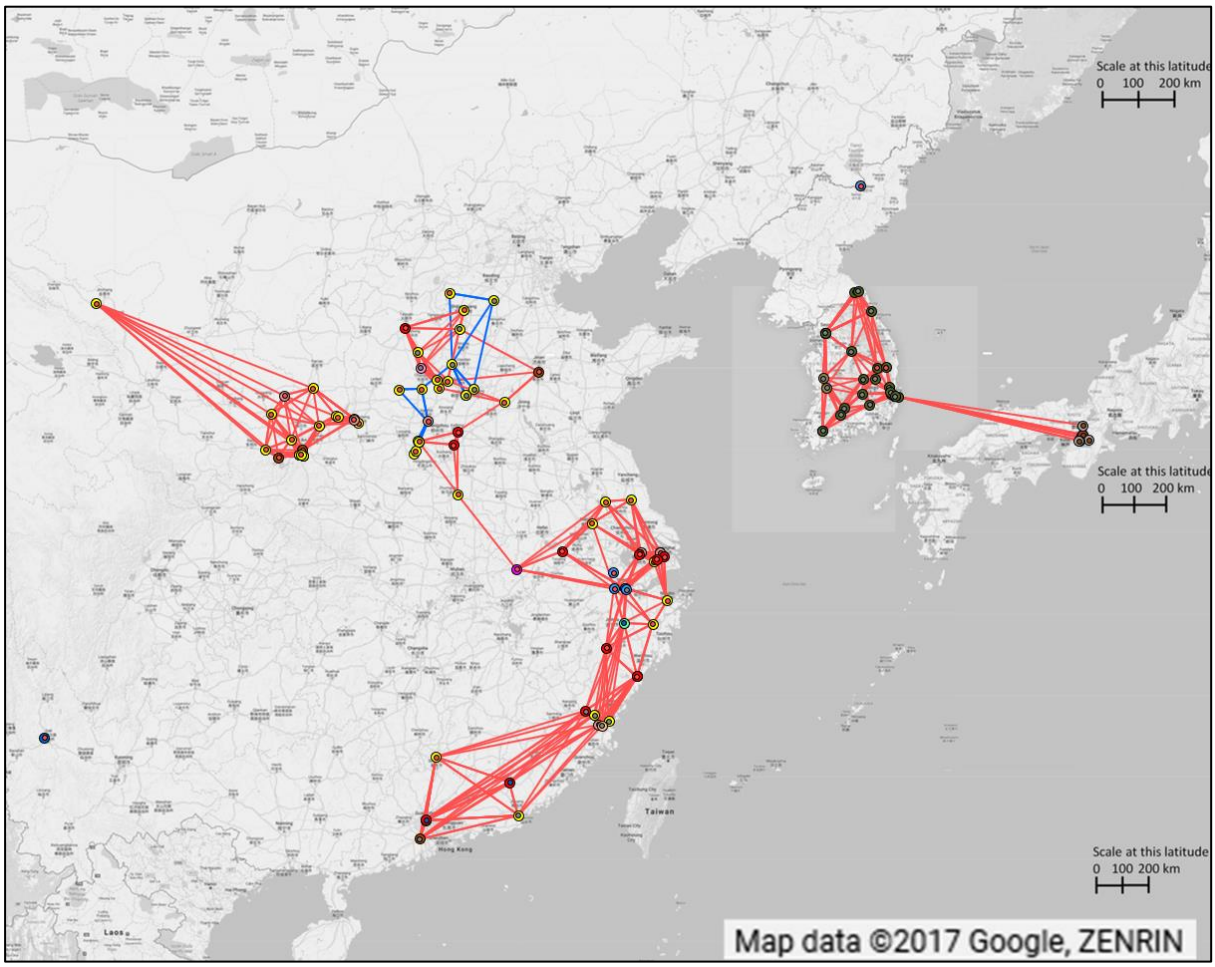

Single feature map of ‘dense eaves’, among Liao pagodas.

Fig. 3.57:



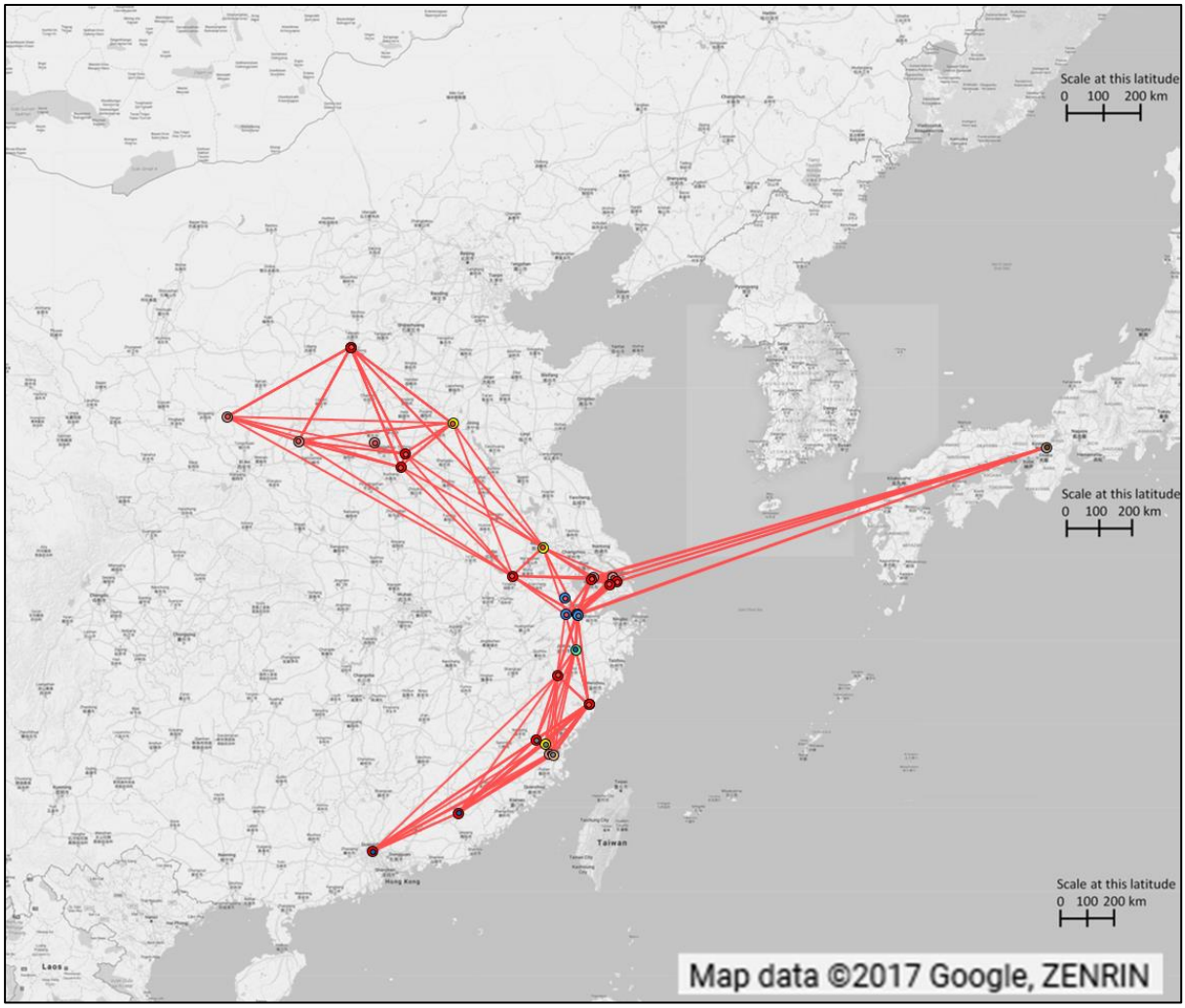

Single feature map of ‘dense eaves’.

Fig. 3.58:



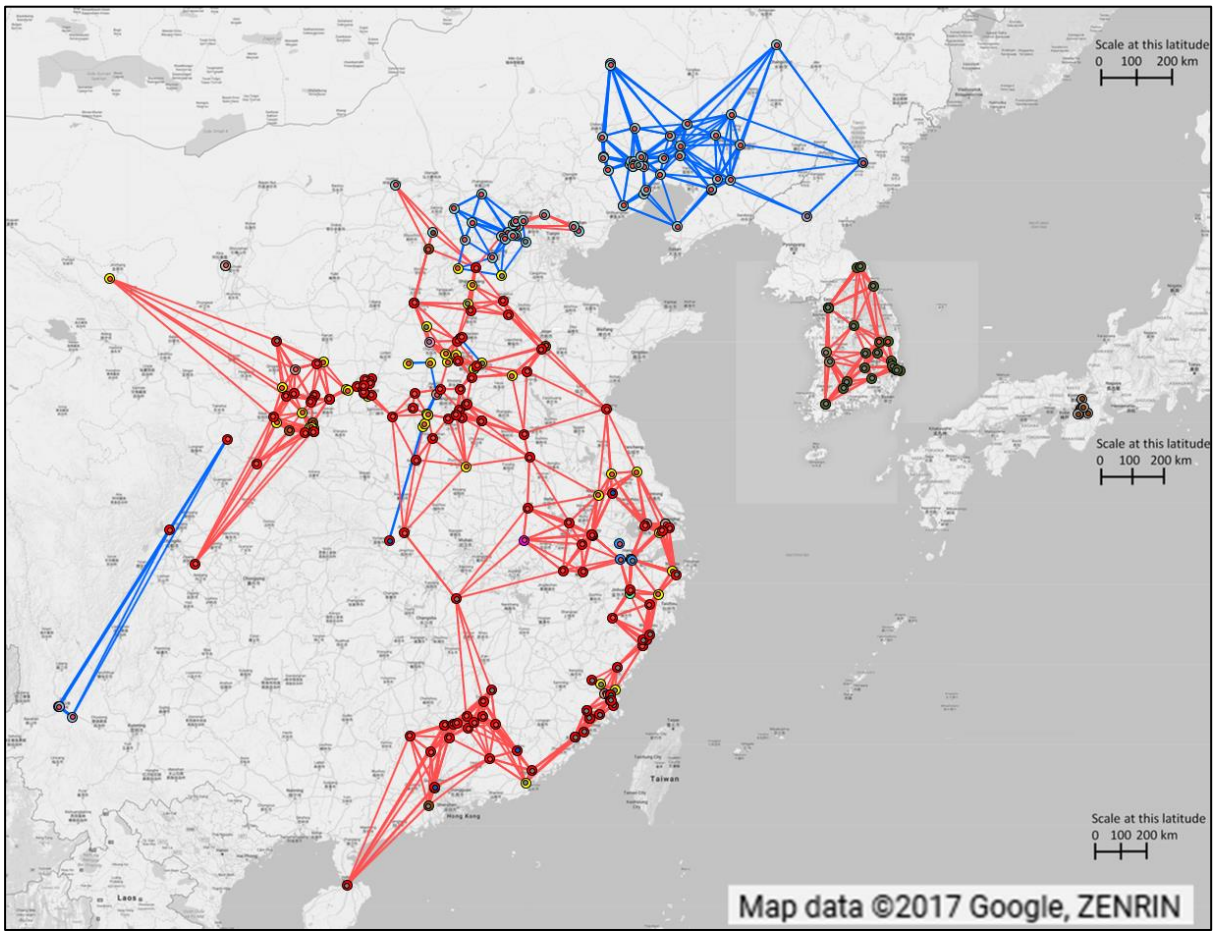

Single feature map of ‘dense eaves’, filtered to pagodas with a confirmed date pre-1007.

Fig. 3.59:



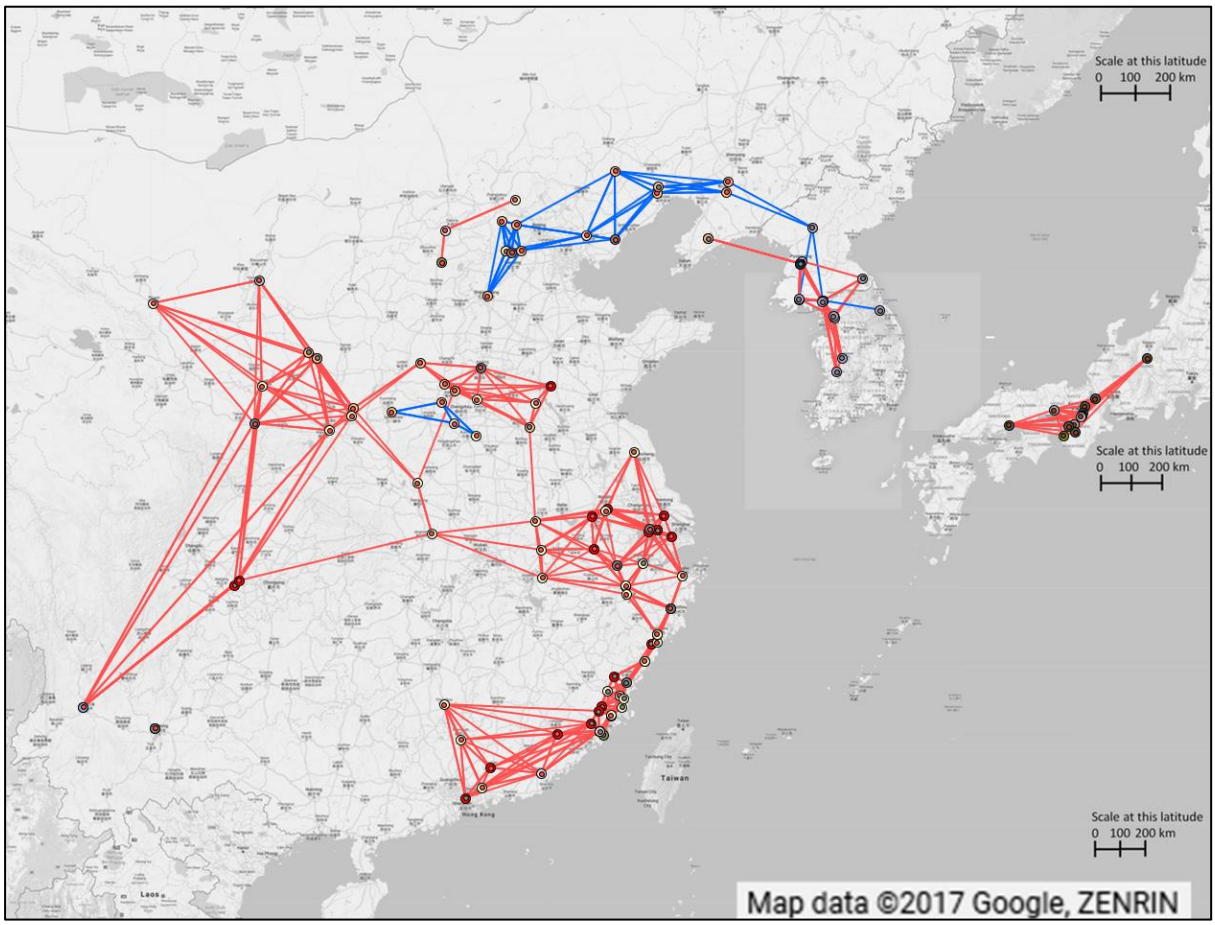

Single feature map of ‘dense eaves’, filtered to pagodas with a confirmed date 907-1007.

Fig. 3.60:



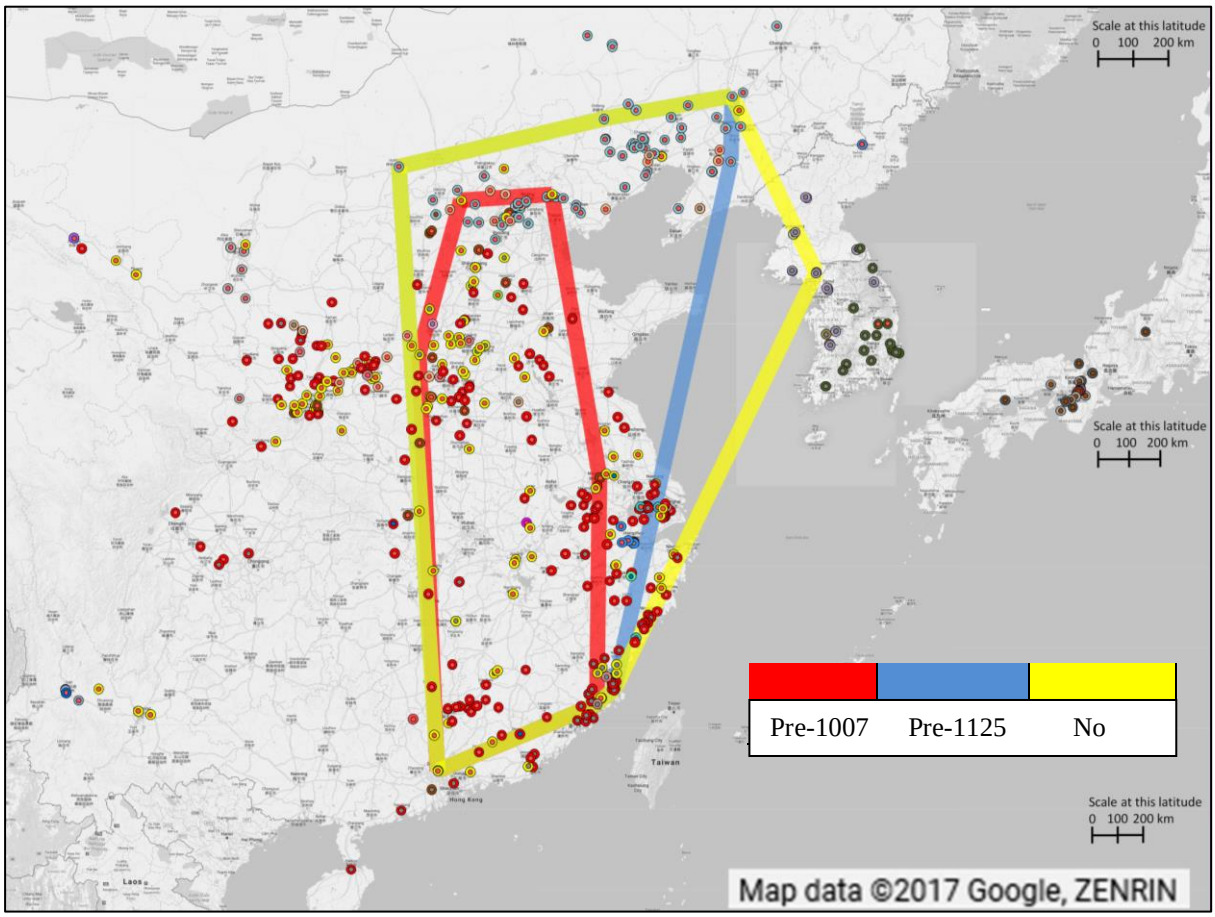

Single feature map of ‘dense eaves’, filtered to pagodas with a confirmed date pre-1125.

Fig. 3.61:



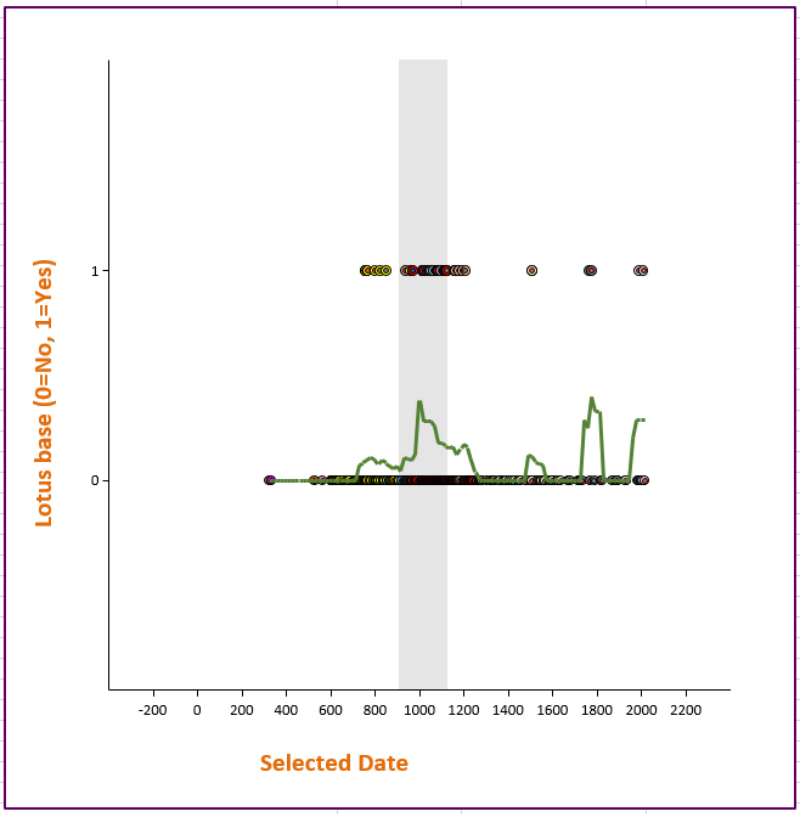

Single feature map of ‘dense eaves’, filtered to pagodas with a confirmed date post-1125.

Fig. 3.62:



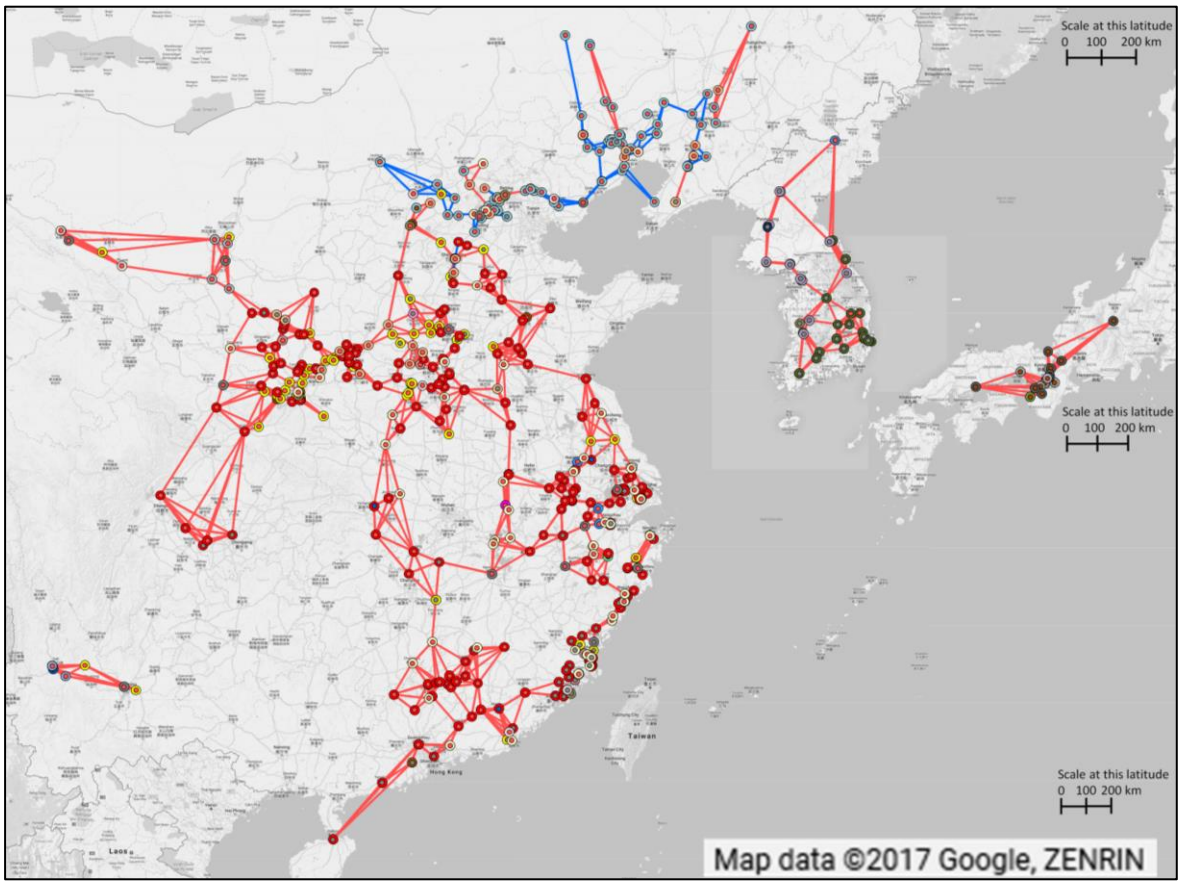

Map created using the 'Venn diagram' function that demonstrates the geographical extent of pagodas with a combination of an 'extended base', 'additional base elements' and a 'lotus base' in different periods.

Fig. 3.63:



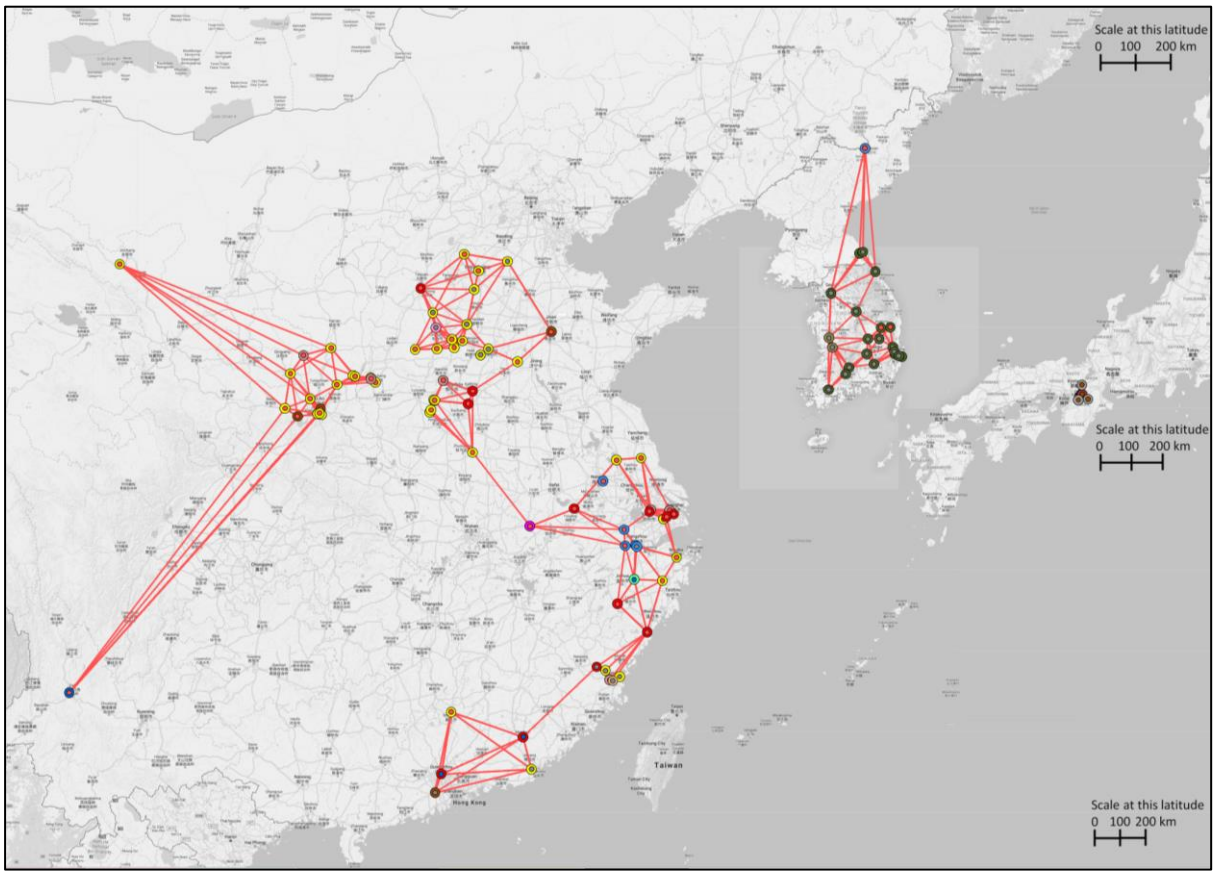

Scatter chart demonstrating the trend for ‘lotus bases’ in pagoda design over time based on the mean date of construction for the current structure.

Fig. 3.64:



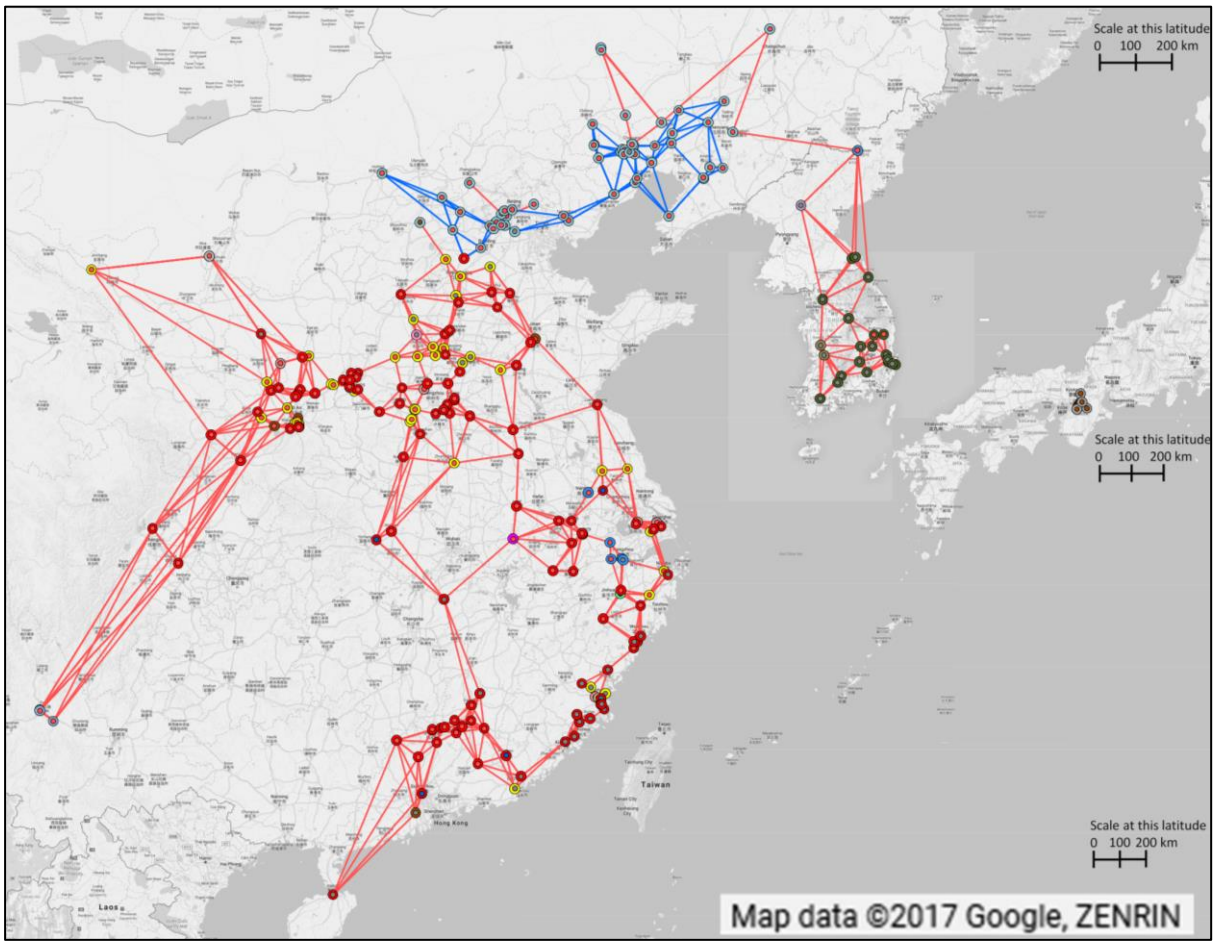

Single feature map of ‘lotus base’.

Fig. 3.65:



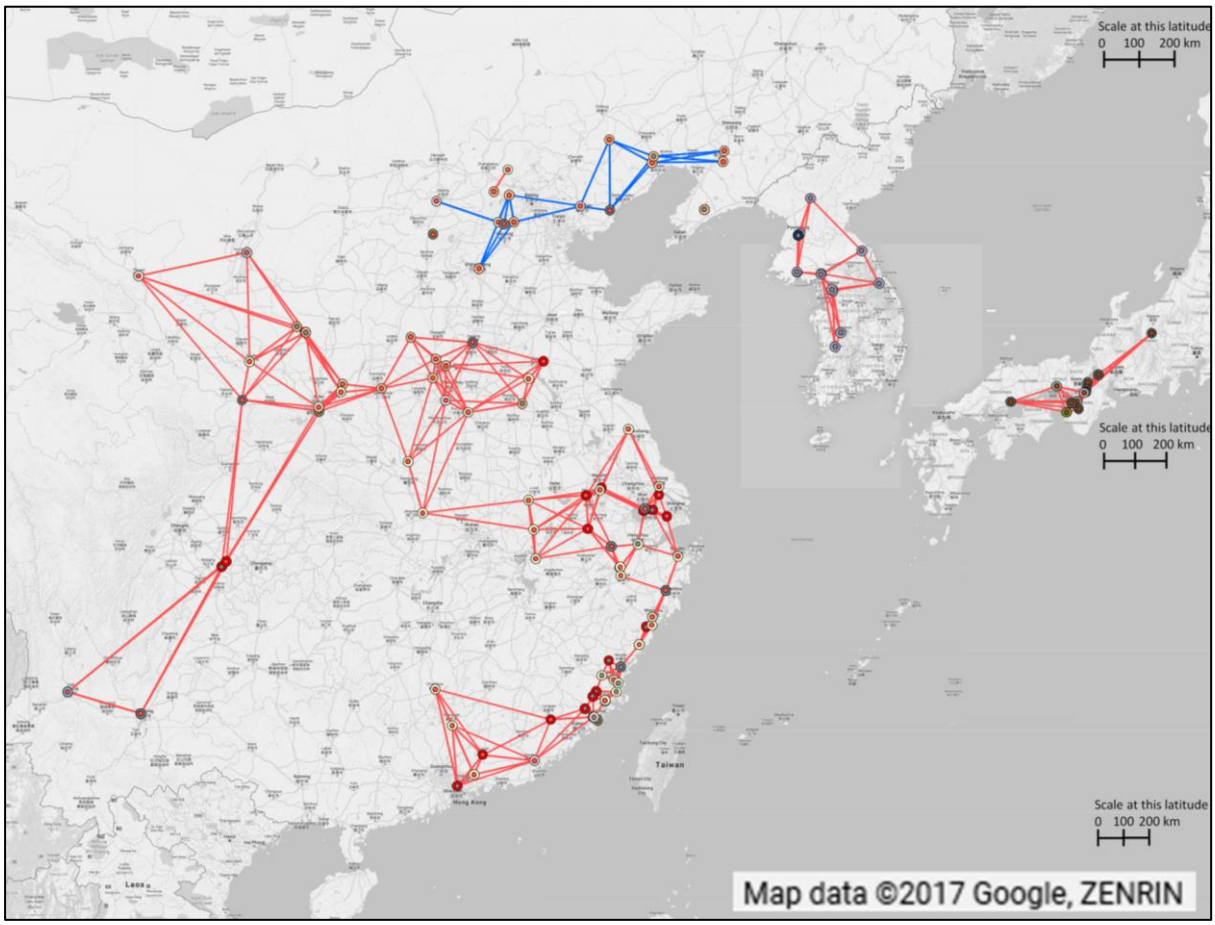

Single feature map of ‘lotus base’, filtered to pagodas with a confirmed date pre-1007.

Fig. 3.66:



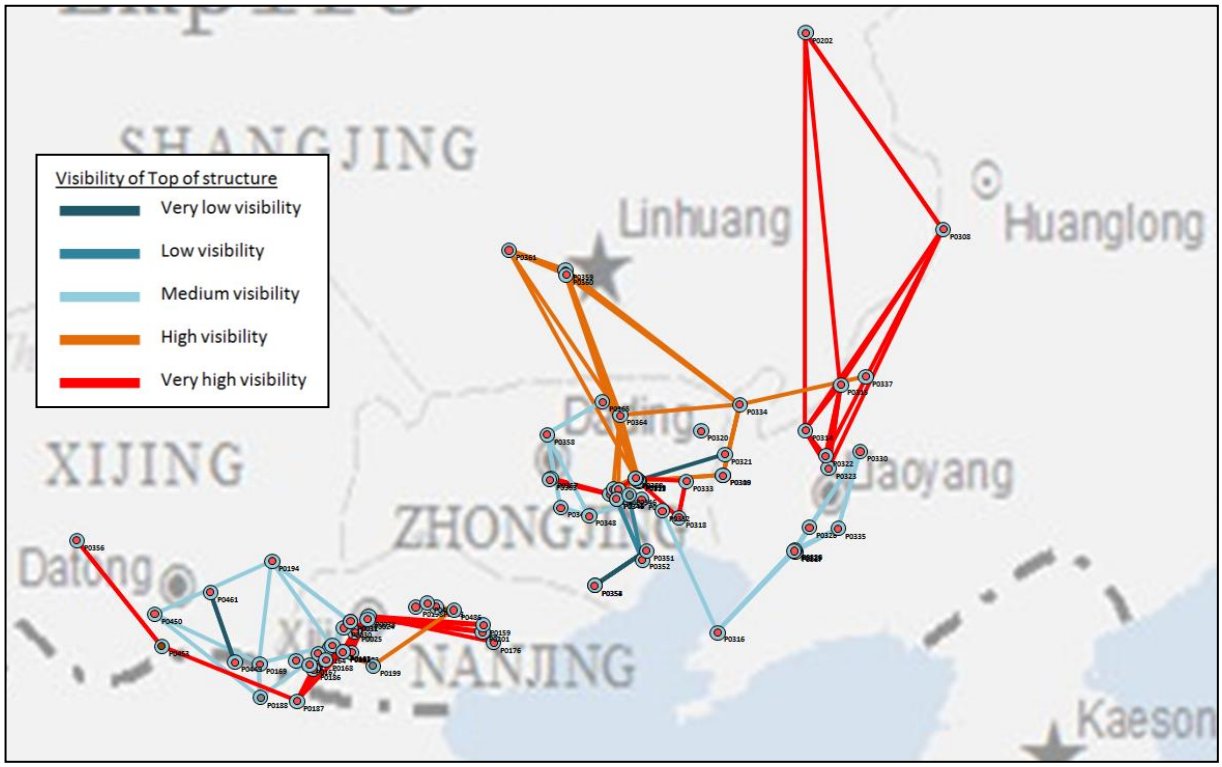

Single feature map of 'lotus base', filtered to pagodas with a confirmed date pre-1125.

Fig. 3.67:



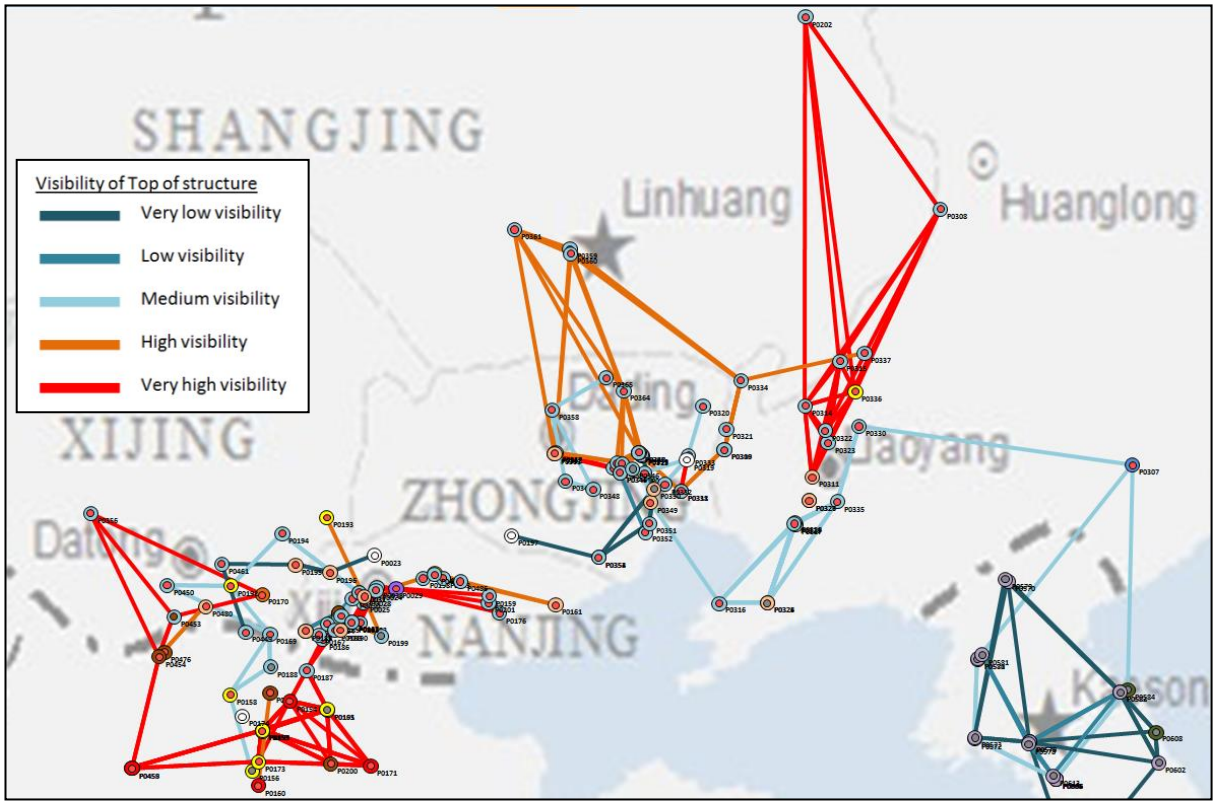

Single feature map of 'lotus base', filtered to pagodas with a confirmed date post-1125.

Fig. 3.68:



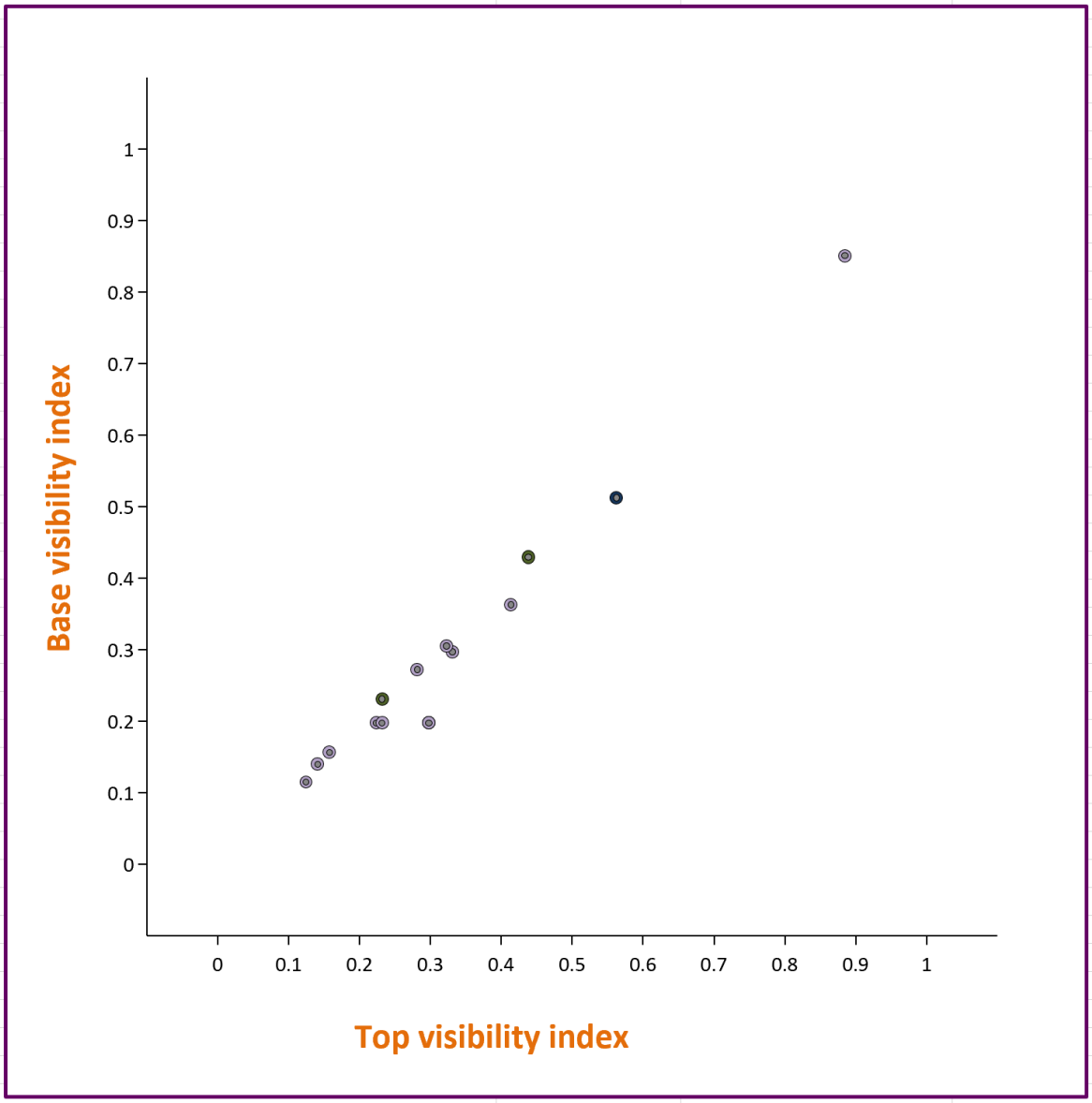

Single feature map of the 'top visibility' of Liao pagodas.

Fig. 3.69:



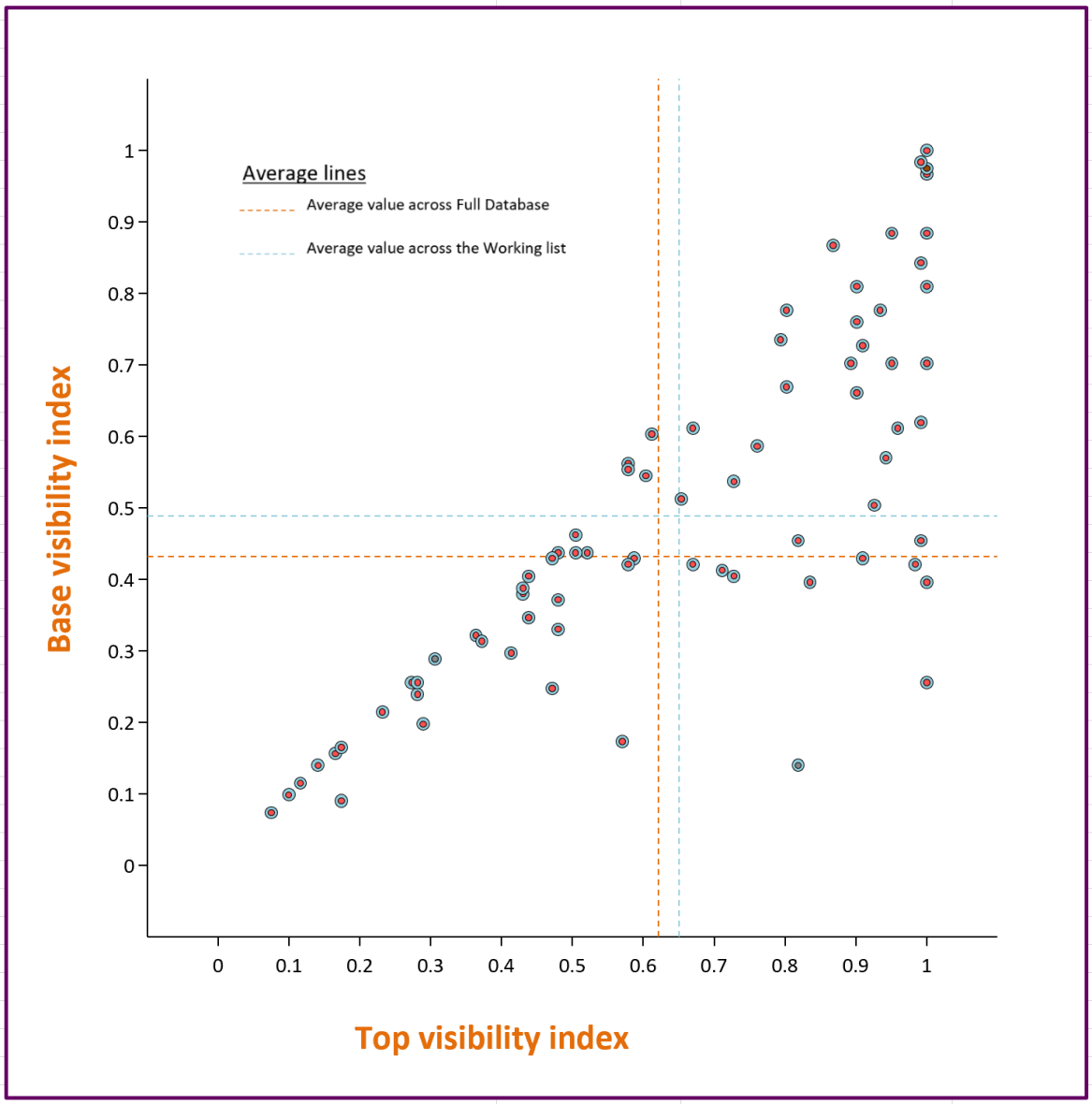

Single feature map of the 'top visibility' of Liao pagodas along with pagodas constructed in the Liao border regions.

Fig. 3.70:



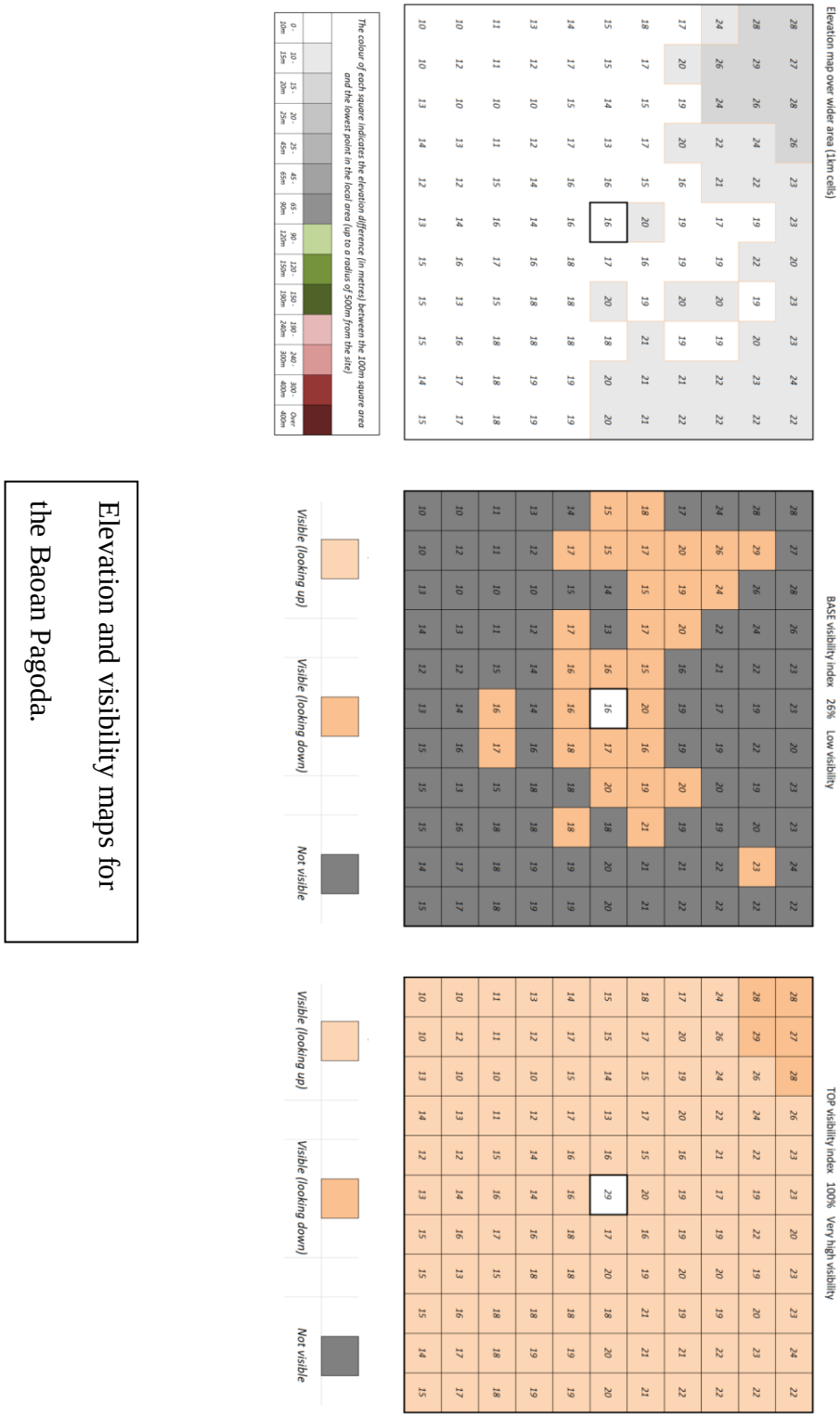

Base visibility index vs. top visibility index for pagodas constructed in North Korea.

Fig. 3.71:

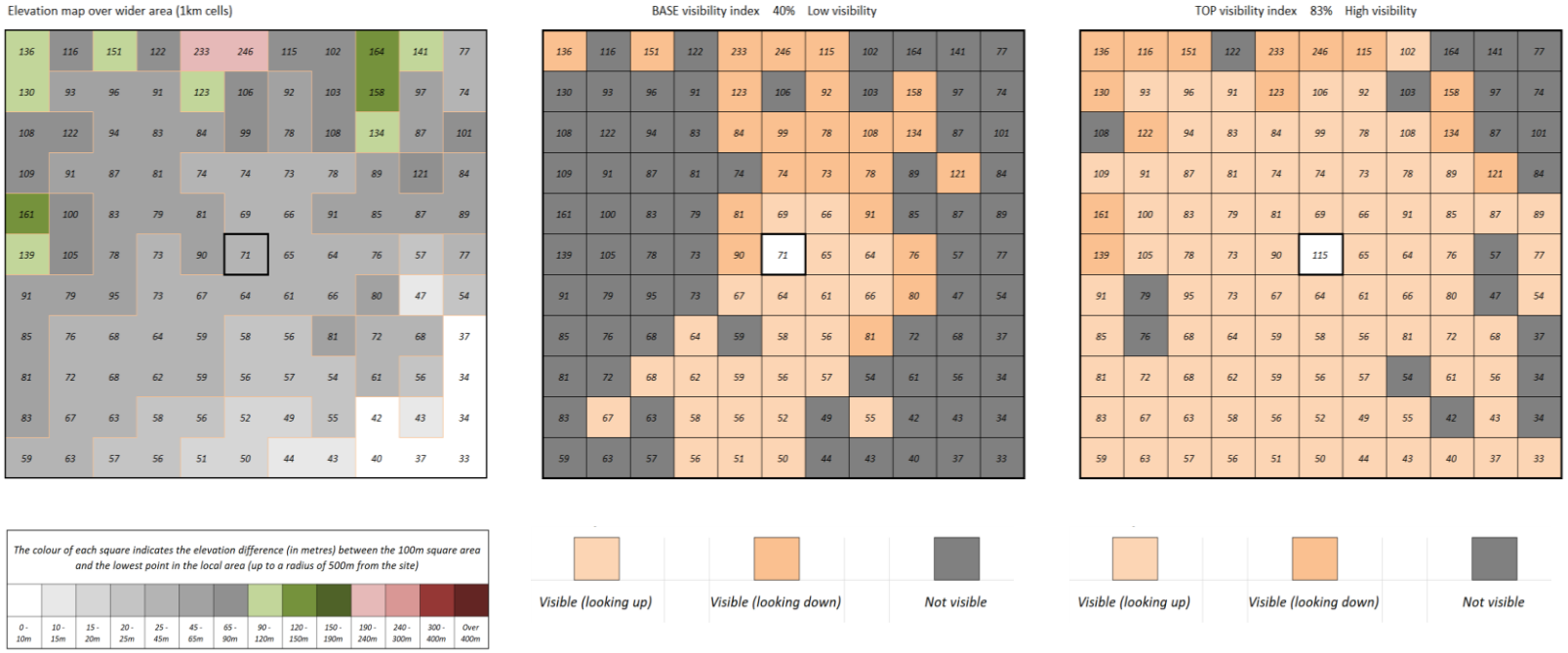



Base visibility index vs. top visibility index for Liao pagodas.

Fig. 3.72: (landscape)

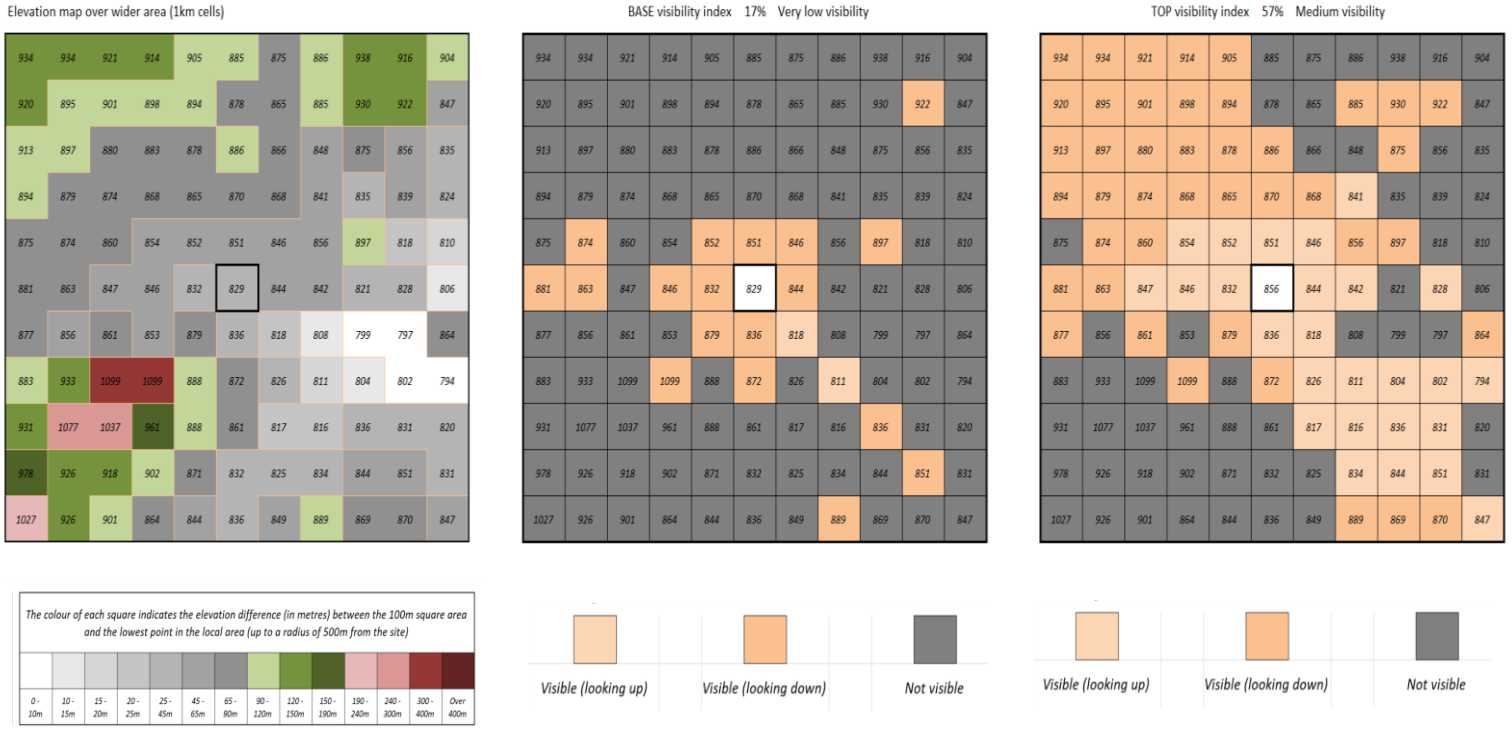



Elevation and visibility maps for the Baoan Pagoda.




Elevation and visibility maps for the Chongxingsi East Pagoda.

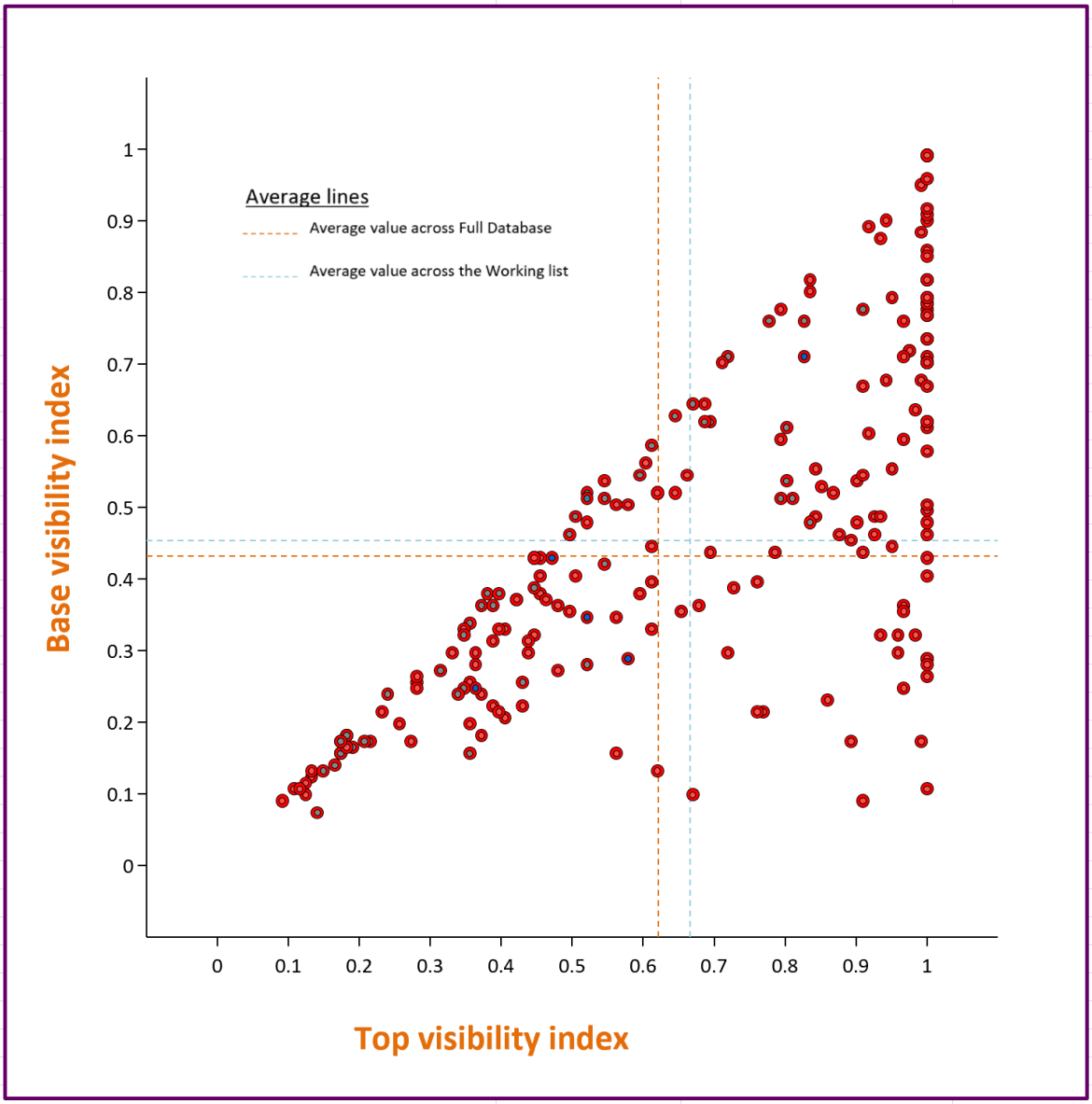
Fig. 3.73: (landscape)




Elevation and visibility maps for the Baoding Xingwen Pagoda.

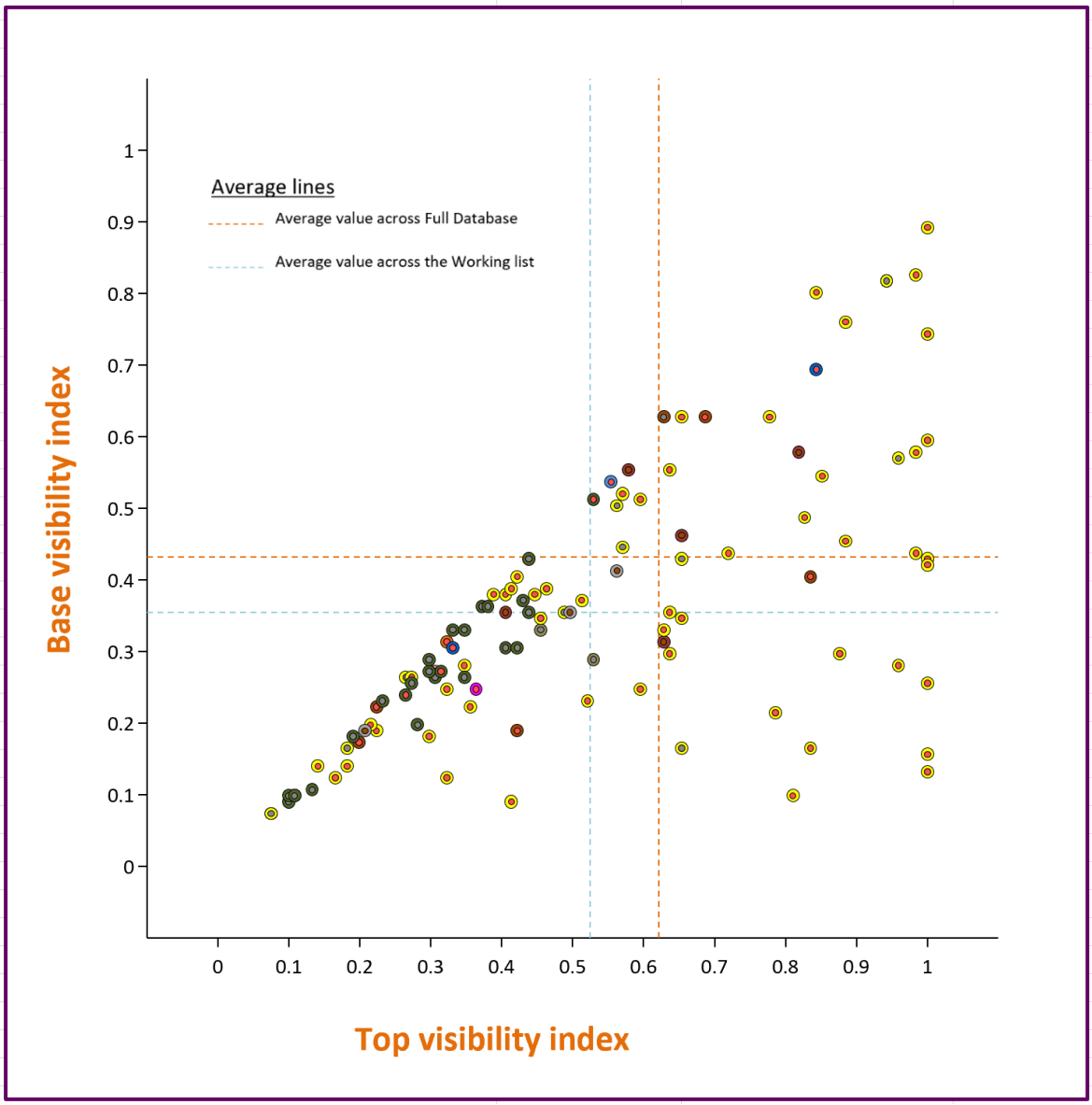
Fig. 3.74: (landscape)

Fig. 3.75:




Base visibility index vs. top visibility index for Song pagodas.

Fig. 3.76:

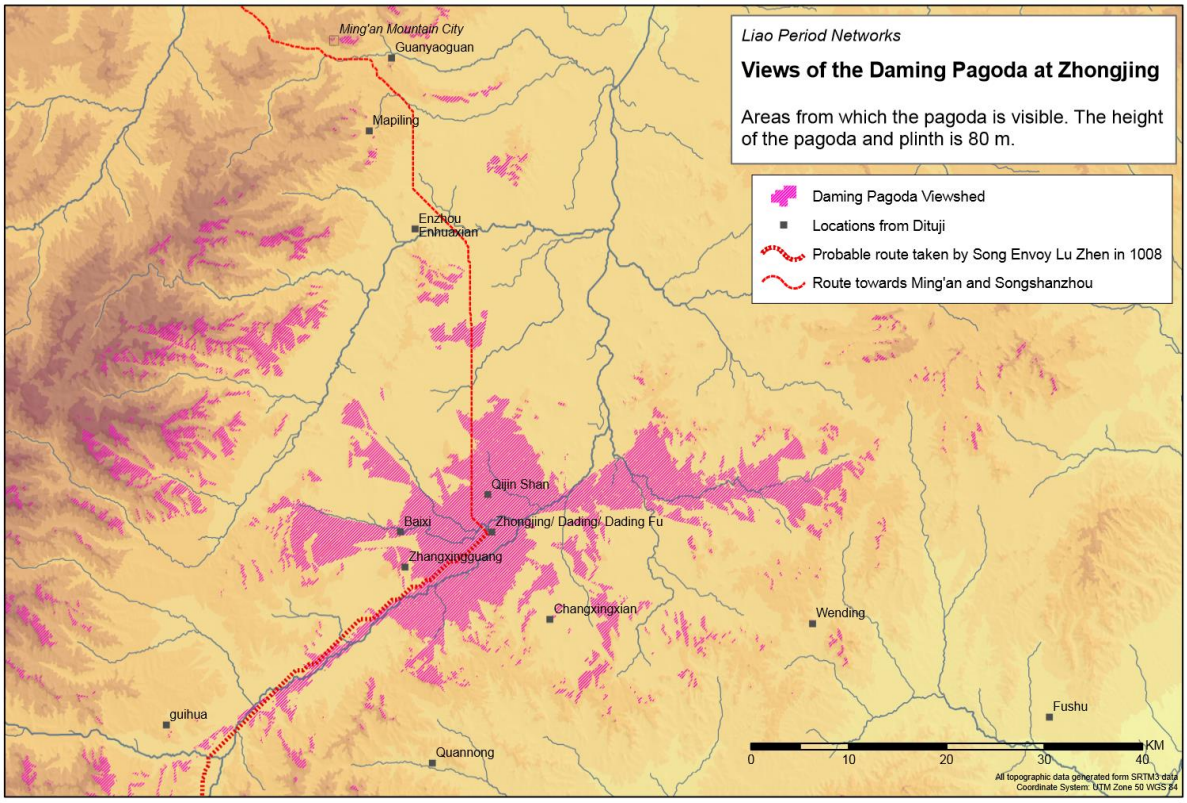



Base visibility index vs. top visibility index for pagodas built prior to 907.

Fig. 3.77:

The Jin Xiao Pagoda (left) and Daming Pagoda (right) from outside the Zhongjing city walls looking north-east (Dugdale 2015).

Fig. 3.78:




Viewshed analysis of the Daming Pagoda, featuring probable route of Song envoys (after Wright 2015 - unpublished).

Fig. 3.79:

| Summary Table | | | |
|---|---|---|---|
| Originating polity | Number of originating sites | Influenced polity | Number of influenced sites |
| Tang | 9 | Liao | 23 |
| Sui | 2 | Liao | 5 |
| Silla | 3 | Liao | 2 |
| Bohai | 1 | Liao | 1 |
| Heian | 1 | Liao | 1 |

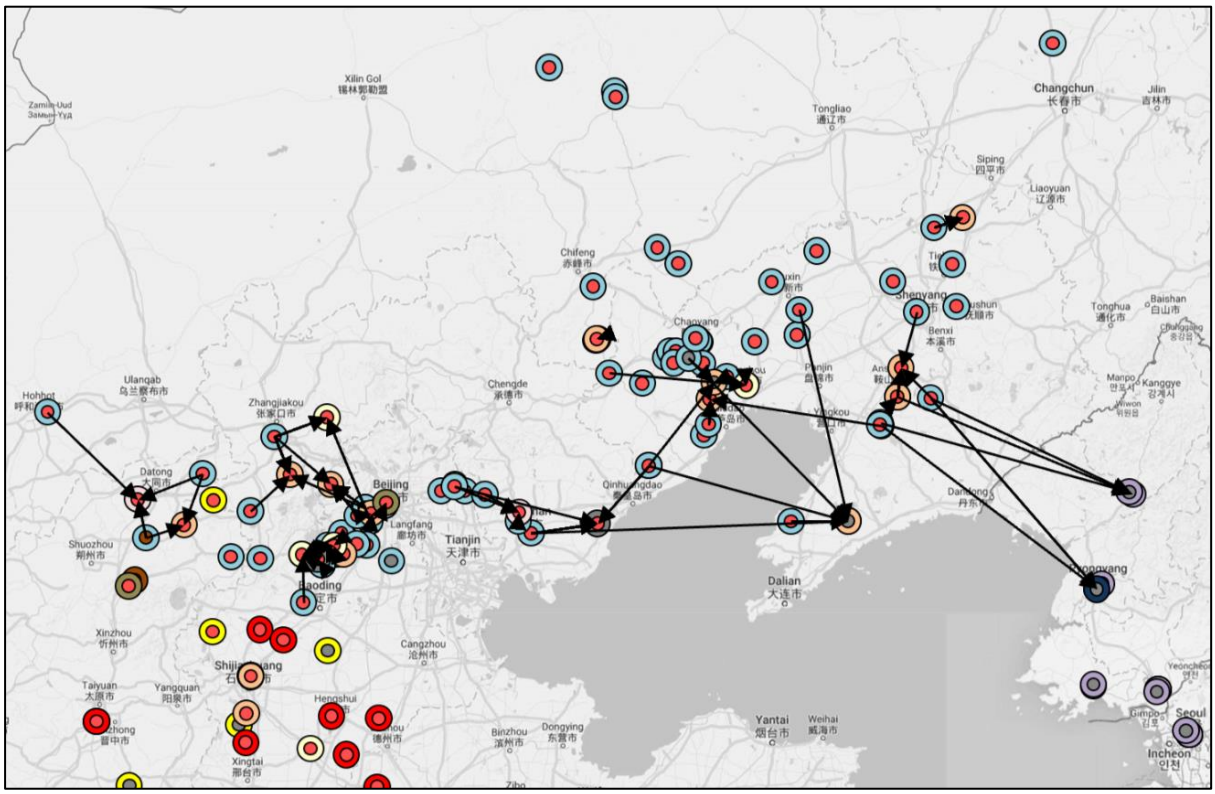
Summary table of influences on Liao pagodas from pagodas by other originating polities.

Fig. 3.80:

| Summary Table | | | |
|---|---|---|---|
| Originating polity | Number of originating sites | Influenced polity | Number of influenced sites |
| Liao | 22 | Jin | 12 |
| Liao | 10 | Ming | 5 |
| Liao | 4 | Goryeo | 3 |
| Liao | 4 | Qing | 2 |
| Liao | 7 | PRC | 2 |
| Liao | 1 | Yuan | 1 |

Summary table of influences originating from Liao pagodas to those of other polities.

Fig. 3.81:



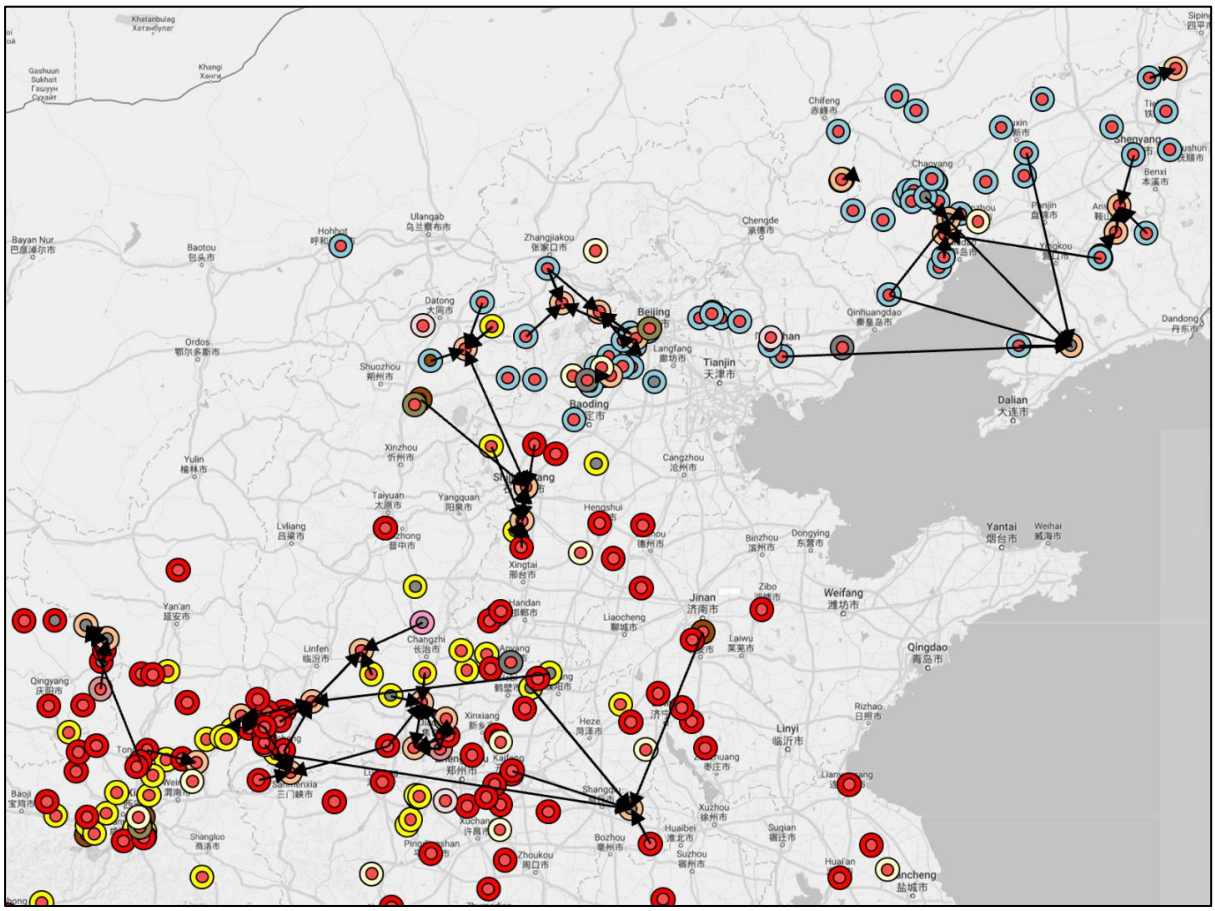

Visualisation of potential influences originating from Liao pagodas to those of other polities.

Fig. 3.82:

| Summary Table | | | |
|---|---|---|---|
| Originating polity | Number of originating sites | Influenced polity | Number of influenced sites |
| Song | 19 | Jin | 13 |
| Liao | 22 | Jin | 12 |
| Tang | 11 | Jin | 10 |
| Five Dynasties | 3 | Jin | 5 |
| Sui | 2 | Jin | 2 |

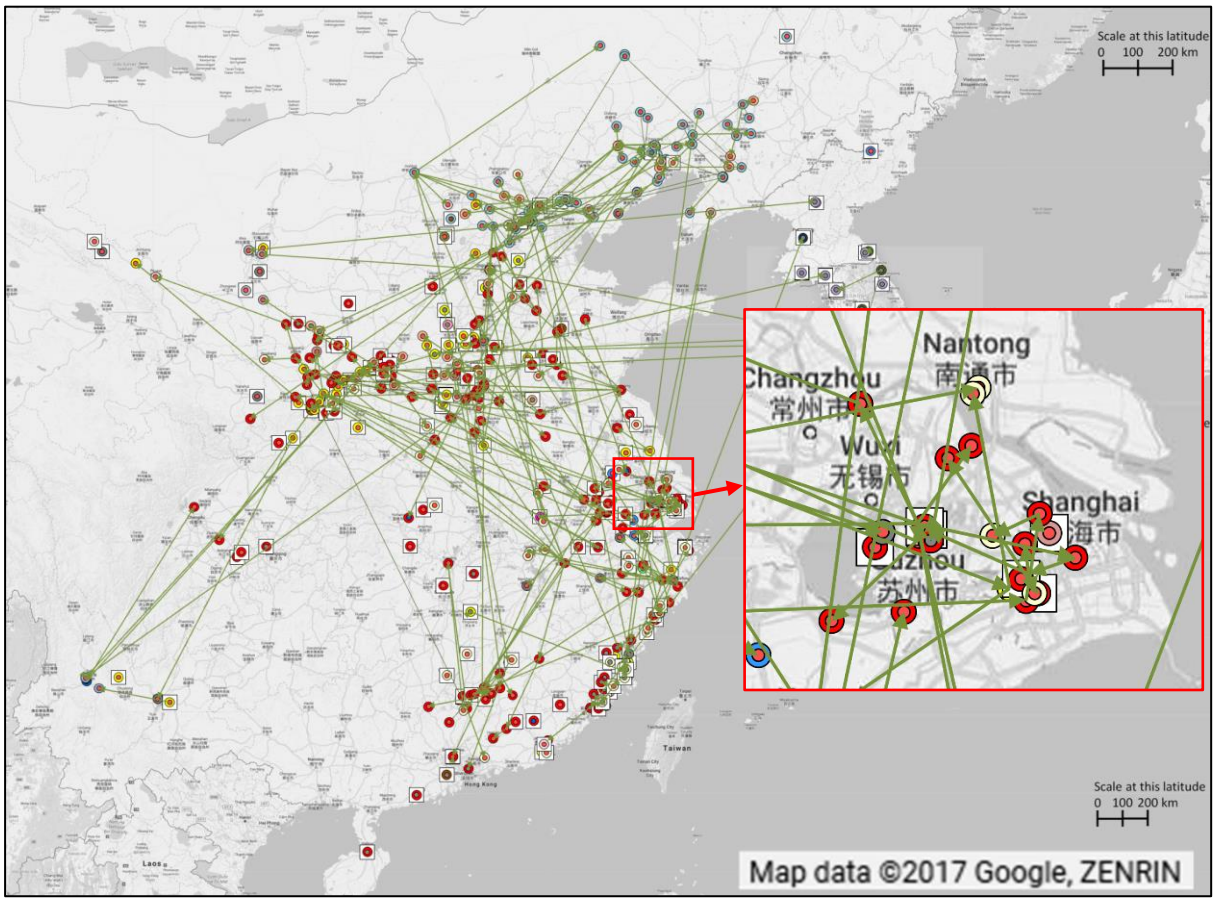
Summary table of influences on Jin pagodas from pagodas by other originating polities.

Fig. 3.83:



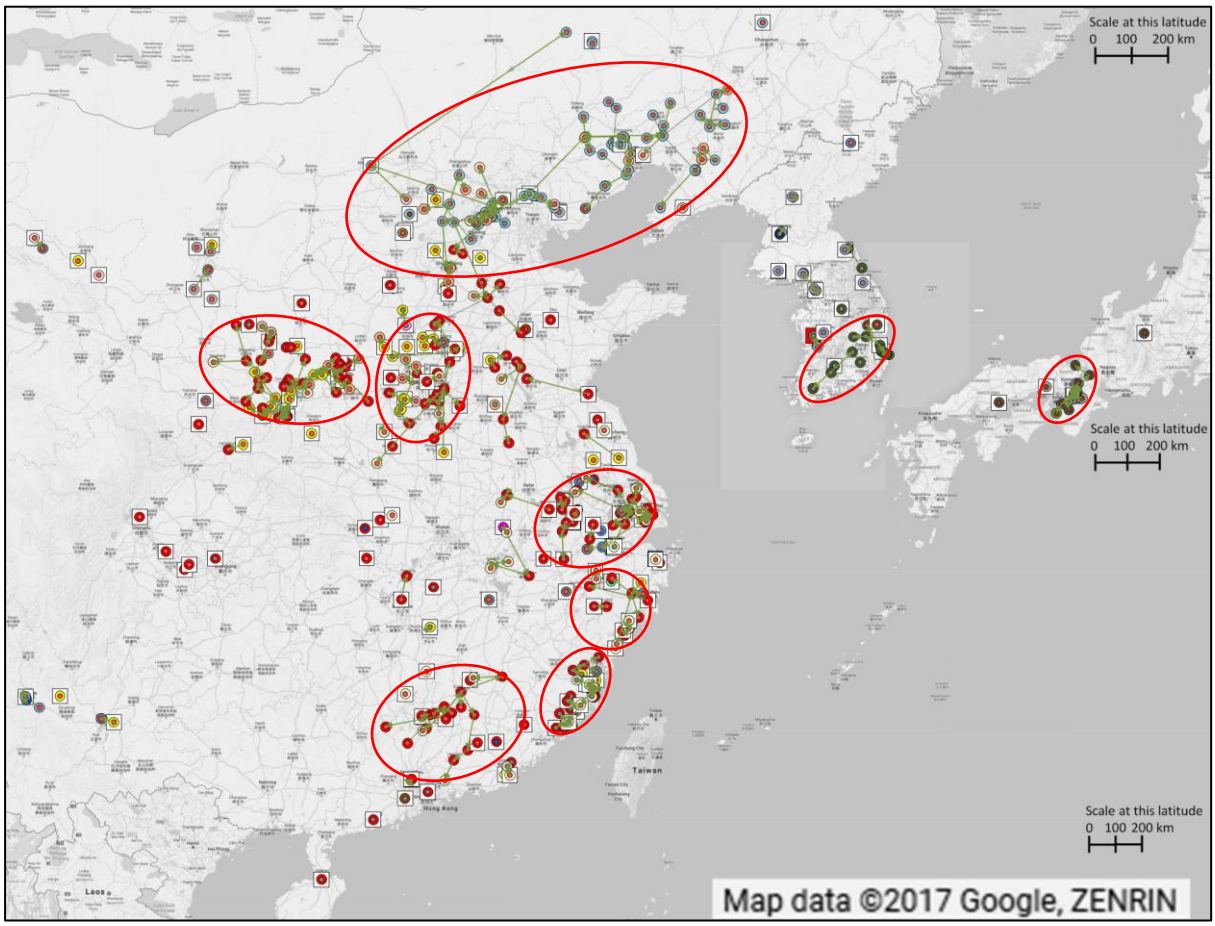

Visualisation of potential influences on Jin pagodas from pagodas by other originating polities.

Fig. 3.84:




‘Spread by similarity’ map showing links between pagodas sharing seven or more features (inset shows zoomed in image of region around Shanghai).

Fig. 3.85:




‘Spread by similarity’ map showing links between pagodas sharing seven or more features with a medium distance filter applied (circles demarcate areas with ten or more connected

Fig. 3.86:

| 35% | 57% | 9% | 36% | 29% | 35% |
|---|---|---|---|---|---|
| 9.90 ( 25 with no data ) | 10.38 ( 30 with no data ) | 8.78 ( 2 with no data ) | 11.12 ( 100 with no data ) | 9.89 ( 29 with no data ) | 10.94 ( 91 with no data ) |
| (1) All pagodas of the same polity | (2) All pagodas within 200 km | (3) All pagodas built in the 100 years prior to this pagoda's own construction | (4) All pagodas of the same polity AND within 200 km | (5) All pagodas of the same polity AND built in the 100 years prior to this pagoda's own construction | (6) All pagodas within 200 km AND built in the 100 years prior to this pagoda's own construction |

Similarity index comparison across all pagodas in the HEAP Database.