

LANDSCAPE ANALYSIS OF TOMBS OF THE FINAL KOFUN PERIOD IN THE KAWACHI AREA USING A THREE-DIMENSIONAL MODEL

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Introduction

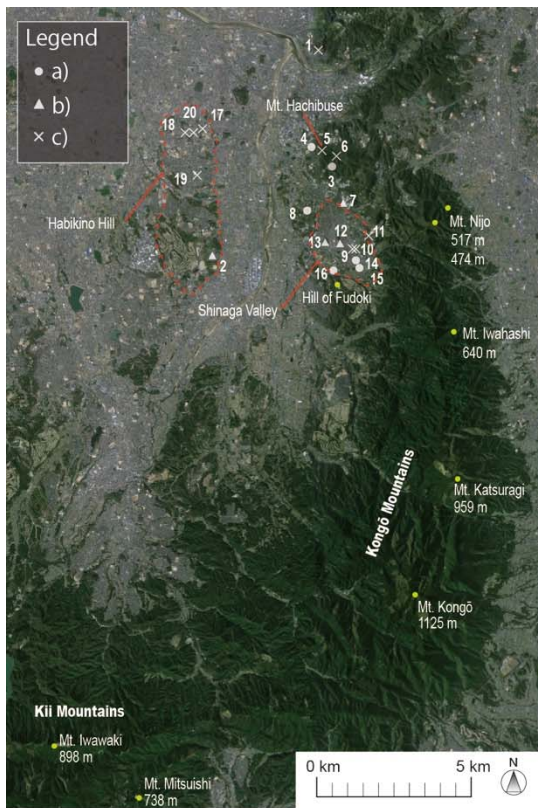
Many of the tomb mounds constructed in the Final Kofun period—the 6th century through the latter part of the 7th century when the trend of keyhole-shaped tomb mounds had faded and the national governance system based on *ritsuryō* codes began—are smaller and look more integral with the natural landscapes when compared with tomb mounds constructed in the early and later Kofun periods, when large-scale tomb mounds were predominant. While the tomb mounds are precious cultural assets that convey ancient thoughts and cultures with an emphasis on achieving harmony between artificial objects and nature, except for a small number of well-preserved tombs, most are ruined and the preservation conditions of the tombs and surrounding natural landscapes are hardly satisfactory. Thus, it is necessary to preserve not only the tomb mounds themselves but also their surrounding natural landscapes.

Previous studies [1, 2] failed to discover any materials associated with the Feng-Shui thoughts held at that time were found. However, concepts originally developed for the selection of tomb locations and the locating principles of tombs of the Final Kofun period must have been based on *Feng-Shui* doctrines imported to Japan. Thus, revealing their locating principles will provide clues to uncover the then-current *Feng-Shui* thoughts.

Methods

The target ancient tombs of my analysis are 20 tombs of the Final Kofun period located in the Kawachi area (Fig.1) that have a Yokoana-shiki sekishitsu (horizontal stone chamber) or Yokoguchi-shiki sekkaku (stone sarcophagus with side entrance) and have a stone chamber/sarcophagus opening in the axial direction [3, 4, 5, 6]. Through on-site survey, I discerned the present conditions, measured the axial directions and took photographs of the landscape from the tombs. The target tombs were classified into the following three types based on their views: a) having a good view; b) having a partially obstructed view; and c) having a bad view (including relocated tombs) (Figs.1, 2). As 10 tombs were classified as c) having a bad view, simulation using a three-dimensional model is essential for visualization of the landscape.

Using a three-dimensional model¹, I created visible region maps and simulated images of the natural landscape view from each tomb (Figs. 3, 4)², and analyzed them to determine the characteristics of the natural landscapes from the tombs and the relationship between the landscape and each axial direction.



- Tombs**
1. Ando G6-3rd Tomb: 50 m (Relocated)
 2. Okameishi Tomb: 93 m
 3. Kannonzuka Tomb: 96 m
 4. Hachibuseyama-nishimine Tomb: 133m
 5. Hachibuseya-minamimine Tomb: 194m
 6. Oko 8th Tomb: 161 m
 7. Taiheizuka Tomb: 69 m
 8. Goryoyama Tomb: 80 m
 9. Matsuzuka Tomb: 111 m (Relocated)
 10. Buddaji Tomb: 119 m
 11. Emperor Kotoku's Tomb: 140m
 12. Emperor Yomei's Tomb: 92 m
 13. Ueshiro Tomb: 76m
 14. Emperor Suiko's Tomb: 110 m
 15. Futagozuka Tomb: 114m
 16. Ishizuka Tomb: 71 m
 17. Koguchiyama Tomb: 60 m
 18. Hichinjoikenishi Tomb: 60 m (Relocated)
 19. Tokurakuyama Tomb: 78 m (Relocated)
 20. Tsukaana Tomb: 70 m



Fig. 1: Topographical map of target ancient tombs of the Final Kofun period located in the Kawachi area

Fig. 2: Example photos of each present condition type

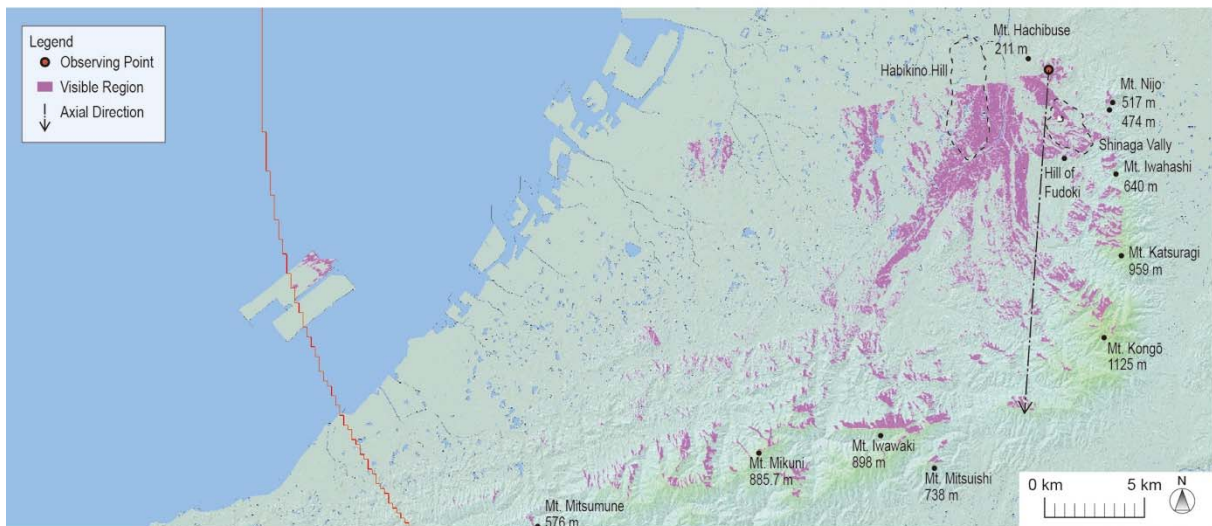


Fig. 3: Visible region map from Oko 8th Tomb (No.6)

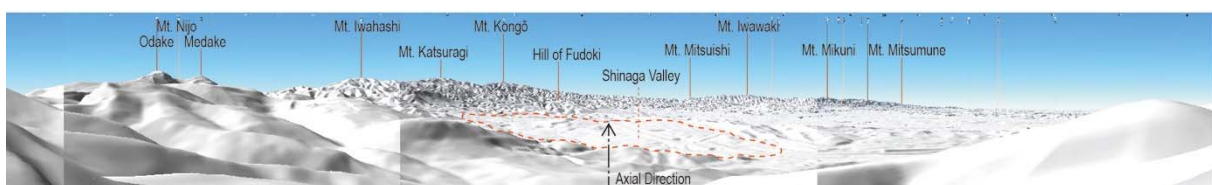


Fig. 4: Simulated image of natural landscape view from Oko 8th Tomb (No.6)

Results and Discussion

Table 1 shows the results of my analysis.

Table 1: Results of Analysis

Legend ○: visible △: partly visible ×: invisible axial direction

No.	Name of Tomb	Present Condition Type	Axis Direction (degree (°))	Relationship with Natural Landscape	Visible Landscape											Characteristics of Natural Landscape view from Each Tomb	Landscape Type			
					Distant View			Kii Mountains				Bay		Intermediate View				Hill of Fudoki		Habikino Hill
					Kongō Mountains	Mt. Nijo	Mt. Iwahashi	Mt. Katsuragi	Mt. Kongō	Mt. Mitsuishi	Mt. Iwakaki	Mt. Mikuni	Mt. Mitsuunune	Osaka Bay	Mt. Hachibuse	Shinaga Valley	Hill of Fudoki	Habikino Hill		
1	Ando G6-3 ^d	c)	unknown	N/A	△	○	△	○	○	△	○	○	○	×	○	×	×	○	Intermediate view of Mt. Hachibuse and Habikino Hill and divided distant view of the Kongō and Kii Mountains (Visually Enclosed space)	2)
2	Okameishi	b)	164	Slightly West of the Mt. Kongō	○	○	○	○	○	○	○	○	○	×	○	×	×	N/A	Distant panoramic view of the Kongō and Kii Mountains over intermediate view of the basin and short-distance view of Habikino Hill	1)
3	Kannonzuka	a)	161	Between Mt. Katsuragi and Mt. Kongō (Suiko's Tomb)	△	○	○	○	○	○	○	○	○	×	×	○	○	○	Distant panoramic view of the Kongō and Kii Mountains over intermediate view of Shinaga Valley	1)
4	Hachibuseyamamishimine	a)	269	Osaka Bay	×	○	○	○	○	○	○	○	○	○	N/A	○	○	○	Distant panoramic view of Osaka Bay, the Osaka Plain and mountains over intermediate view of Habikino Hill	4)
5	Hachibuseyamaminimine	c)	168	Mt. Kongō	△	○	○	○	○	○	○	○	○	○	N/A	○	○	○	Distant panoramic view of the Kongō and Kii Mountains over intermediate view of Shinaga Valley	1)
6	Oko 8 th	c)	184	Between Mt. Kongō and Mt. Mitsuishi	△	○	○	○	○	○	○	○	○	△	N/A	○	○	○	Distant panoramic view of the Kongō and Kii Mountains over intermediate view of Shinaga Valley	1)
7	Taiheizuka	b)	192	Between Mt. Kongō and Mt. Mitsuishi	△	○	○	○	△	△	△	×	×	×	×	○	○	△	Intermediate view of the surrounding mountains and partially distant view of the Kongō and Kii Mountains (Visually Enclosed Space)	3)
8	Goryoyama	a)	162	Mt. Kongō	△	○	○	○	○	○	○	○	○	×	×	×	×	×	Distant panoramic view of the Kongō and Kii Mountains over intermediate view of the surrounding mountains	1)
9	Matsuizuka	c)	unknown	N/A	△	○	○	○	○	×	○	○	○	×	○	○	○	△	Intermediate view of the surrounding mountains and divided distant view of the Kongō and Kii Mountains	2)
10	Buddaji	c)	193	Hill of Fudoki (Emperor Suiko's Tomb)	△	○	○	○	○	×	○	○	○	×	○	○	○	○	Intermediate view of the surrounding mountains and divided distant view of the Kongō and Kii Mountains	2)
11	Emperor Kotoku's	c)	203	West of the Hill of Fudoki (Futagozuka Tomb)	×	○	△	○	×	○	○	○	△	N/A	○	○	○	○	Intermediate view of the mountains surrounding Shinaga Valley and divided distant view of the Kongō and Kii Mountains (Visually Enclosed Space)	2)
12	Emperor Yomei's	b)	180	Hill of Fudoki	○	○	○	○	△	○	○	○	×	△	○	○	○	○	Intermediate view of the mountains surrounding Shinaga Valley and divided distant view of the Kongō and Kii Mountains	2)
13	Ueshiro	b)	184	Between Mt. Kongō and Mt. Mitsuishi	△	○	○	○	○	○	○	○	×	×	○	○	○	○	Distant panoramic view of the Kongō and Kii Mountains over intermediate view of Shinaga Valley	1)
14	Emperor Suiko's	a)	166	Slightly East of the Mt. Kongō	△	△	○	△	×	△	○	○	×	○	N/A	×	×	○	Short-distance view of the surrounding mountains in Shinaga Valley and partially distant view of the Kongō and Kii	3)
15	Futagozuka	a)	144	Between Mt. Iwahashi and Mt. Katsuragi	△	×	○	△	×	×	△	○	×	△	N/A	○	○	○	Short-distance view of the surrounding mountains in Shinaga Valley and partially distant view of the Kongō and Kii Mountains (360 degree open on the hill in Shinaga Valley)	3)
16	Ishizuka	a)	unknown	N/A	△	○	○	×	×	△	×	×	×	×	N/A	○	×	×	Short-distance view of the surrounding mountains in Shinaga Valley and partially distant view of Kongo Mountains	3)
17	Koguchiyama	c)	179	Between Mt. Kongō and Mt. Mitsuishi	○	○	○	○	×	△	×	×	×	○	×	○	N/A	N/A	Distant panoramic view of the Kongō Mountains over short-distance view of Habikino Hill	1)
18	Hichinjoikenishi	c)	unknown	N/A	○	○	○	○	×	×	×	×	×	×	×	×	N/A	N/A	Short-distance view of Habikino Hill and partially distant view of the Kongō Mountains	3)
19	Tokurakuyama	c)	unknown	N/A	○	○	○	○	△	○	○	△	×	○	△	○	N/A	N/A	Distant panoramic view of the Kongō and Kii Mountains over short-distance view of Habikino Hill	1)
20	Tukaana	c)	172	Between Mt. Kongō and Mt. Mitsuishi	○	○	○	○	○	○	○	○	○	○	△	○	N/A	N/A	Distant panoramic view of the Kongō and Kii Mountains over short-distance view of Habikino Hill (360 degree open on Habikino hill)	1)

Characteristics of the natural landscape view from each tomb: Most of the landscape views from each tomb consist of the Kongō and/or Kii Mountains as a distant view and basins, hills or mountains as an intermediate and/or short-distance view. The characteristics of the natural landscape views from the 20 tombs were classified into the following four landscape types: 1) having a distant panoramic view of the Kongō and/or Kii Mountains over an intermediate and/or short-distance view of nearby hills and/or mountains (Nos.2, 3, 5, 6, 8, 13, 17, 19 and 20); 2) having an intermediate view of the surrounding mountains and a divided distant view of the Kongō and/or Kii Mountains (Nos.1, 9, 10, 11 and 12); 3) having an intermediate and/or short-distance view of the surrounding mountains and a partially distant view of the Kongō and/or Kii Mountains. (Nos. 7, 14, 15, 16 and 18); 4) having a distant panoramic view of Osaka Bay, the Osaka Plain and mountains (No. 4).

Relationship between the natural landscape and the axial direction of each tomb: The axial directions of almost all of the tombs face mountains (Nos. 2, 5, 8 and 14 face Mt. Kongō; Nos. 10, 11 and 12 face the Hill of Fudoki; Nos. 6,11,13,17 and 20 face between Mt. Kongō and Mt. Mitsuishi; and Nos. 3 and 15 face the Kongō Mountains). The exception is No. 4, whose axial direction faces Osaka Bay. It is possible that the axial directions of nearly all of the tombs were selected based on the mountain views, in particular Mt. Kongō and the Kongō Mountains.

Conclusion

Using a three-dimensional model, I analyzed the natural landscape views from 20 tombs of the Final Kofun period located in the Kawachi area to determine their characteristics and the relationship between landscape and each axial direction. As a result, I clarified the following:

1. The characteristics of the natural landscape views from the 20 tombs were classified into the following four landscape types: 1) having a distant panoramic view of the Kongō and/or Kii Mountains (9 tombs); 2) having an intermediate view of the surrounding mountains and a divided distant view of the Kongō and/or Kii Mountains (5 tombs); 3) having an intermediate and/or short-distance view of the surrounding mountains and a partially distant view (5 tombs); and 4) having a distant panoramic view of Osaka Bay (1 tomb).
2. It is quite possible that the axial directions of almost all of these tombs were selected based on their mountain views.

Notes

1. The three-dimensional model was developed by using 5 m mesh data distributed by the Geographical Survey Institute using the 'KASHIMIR 3D Ver. 9.2.3' software.
2. The visible range was calculated using the following settings: Center of calculation: position of each tomb and calculation range: 40-km radius. The simulated image of the natural landscape view was calculated using the following settings: Height above the ground: 1 m, photographing range: 40 km; and angle of depression: 0 degrees.

References

- [1] Tembata, H. and Okazaki, S. Enclosed Spaces for Seoul and Kyoto based on Feng-Shui, Archi-Cultural Translations Through the Silkroad, Bahcesehir University Press, 2011.
- [2] Tembata, H. and Okazaki, S. RELATIONSHIPS BETWEEN FENG-SHUI AND LANDSCAPES OF CHANGAN AND HEIJO-KYO, Archi-Cultural Translations Through the Silk Road, 2nd International Conference, Mukogawa Women's University, Japan, July 14-16 2012, Proceedings, Mukogawa Women's University Press, pp.133-138, 2012.
- [3] Mori, K. Journal of Tombs of the Final Kofun period. Hanawa Shobo, 1973. (In Japanese)
- [4] Yamamoto, A. Tombs of the Final Kofun Period and Yokoguchi-shiki sekkaku. Yoshikawa Kobunkan, 2007. (In Japanese)
- [5] Teramura, H. Location of Tombs of the Final Kofun period and Landscape Analysis. 2005. (In Japanese)
- [6] Shimohara, Y. Tombs of the Final Kofun period in the western Japan. Chugokushoten, 2006. (In Japanese)