

Spatial Composition of Intermountain Pastoral Settlements on Slopes in Eastern Anatolia of Turkey: Case Studies of Konaklı Village in Erzurum and Besler Village in Ağrı

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Abstract: To understand the spatial composition of intermountain pastoral settlements on slopes in the Eastern Anatolia Region of Turkey, document searches and field surveys were conducted in the Konaklı Village in Erzurum and in the Besler Village in Ağrı and discussed my results. I identified great differences of spatial composition between the pastoral settlements where people live next to livestock and previously reported farming or forestry settlements. Other differences between the two settlements include the building directions, approaches to houses and livestock barns, presence or absence of walled courtyards, and houses whose roofs have been converted into pitched ones. These differences individualize each settlement and create landscapes appropriate for each area.

1. Introduction

People have lived in the Silk Road countries from Japan to Turkey since the dawn of time. The relationship among nature, architecture, and settlement depends on natural conditions, local communities, and culture. For example, many social and cultural differences exist between Japan, which has islands with high summertime precipitation and Shinto and Buddhist influence, and Turkey, which has low summertime precipitation and inflows of various ethnics, religions and cultures. Despite these differences, in the Silk Road countries, many settlements remain, which were formed before the industrial revolution and have high sustainability that has been confirmed by centuries of history.

Appleton (1975) proposed a prospect-refuge theory, which argues for the following: aesthetic satisfaction from landscapes stems from the spontaneous perception of environmental conditions favorable to survival; the ability to see and the ability to hide are important for the survival of both humans and animals; aesthetic pleasure in landscapes is derived from both prospects corresponding to the ability to see and refuge corresponding to the ability to hide. In fact, many of the settlements in the Silk Road countries that still continue today have prospects provided by slope ground or refuges surrounded by mountains. Understanding the spatial compositions of the settlements and architecture surrounded by mountains or located on slopes is crucial for the clarification of a safe, comfortable and sustainable living environment in coexistence with nature.

Therefore, we have studied intermountain settlements located on slopes for designing, constructing, and conserving such desired living environments. As examples of settlements, we first focused on three villages (Bolkuş, Çiğdemlik and Demirdağ in Fig 1) in northern and central Turkey and conducted

document searches and field surveys of them (Suzuki & Okazaki, 2012a, 2012b). We clarified their spatial structure, which is centered around a mosque or square that supports community formation, houses with mixed structures that effectively use slopes, and a sense of unity in the landscape created by sharing similar shapes, aspects, scales, and roof colors. These three settlements have many two-storied wooden houses with masonry downstairs and pitched roofs. Bolkuş and Çiğdemlik are in the Black Sea Region, and Demirdağ is in the Central Anatolia Region. However, the settlements and houses vary widely by region in Turkey (Güney, 1998; Hara et al., 1973, 1976). Since the above characteristics are supposed to have no application in many areas of Turkey, similar searches in other areas are required.

Some researchers have studied and reported the spatial compositions of settlements on slopes in the following Silk Road countries: Japan (Kasahara & Goto, 1997; Kondo, 1998; Miyazaki & Tabata, 2007, 2009; Uchimura et al., 1987), Taiwan (Nagano & Saiki, 2009), Laos (Hosogai et al., 2007), Thailand (Hata, Shimizu, Kanda & Shida, 1994; Hattori, Hata & Kanda, 1995; Hattori, Hata & Shimizu, 1994; Maruchi, Hata, Arai & Hattori, 1996; H. Suzuki, Hata & Kanda, 1994), Nepal, India, Afghanistan (Hara et al., 1978), Iran (Ashtari, Ahmadi, Salem & Tajeddini, 2012; Hara et al., 1976; Ziael, 2012), Syria (Hara et al., 1978; Yagi, 1986) and Jordan (Hara et al., 1978). In Turkey, Hara et al. (1973, 1976), Maruyama, Anezaki, Yasuda and Hatsumi (1997), Yamazaki, Hidaka, Suda and Hatsumi (1999), and Hidaka, Yamazaki, Suda and Hatsumi (1999) studied such settlements and focused on surveys of the spatial compositions of houses in the settlements on slopes but did not clarify their overall compositions.

Based on the above research, I focused on the Eastern and Southeastern Anatolia Regions of Turkey, whose settlements and

houses are widely different from the Black Sea and Central Anatolia Region. To clarify the spatial compositions of settlements in them, I visited four intermountain villages (Konaklı, Besler, Çevre and Aran in Fig 1) on slopes and conducted field surveys and document searches on them. Along with the previously reported villages, each of these villages fulfill all of the following requirements: (1) its settlement is located on a slope; (2) it is surrounded by mountains and visually separated from the surrounding villages, towns and cities; (3) spatial composition of the entire settlement is easy to understand because of comparatively small population; (4) its documents are available on the Internet and elsewhere.

This paper reports the results and discussions of Konaklı Village in Erzurum Province and Besler Village in Ağrı Province. Both of the pastoral settlements are located in the Eastern Anatolia Region with long, rugged winters and short, clement summers. Because the Erzurum Province is in the center of the Eastern Anatolia Region, the Konaklı Village is thought to have one of the typical intermountain settlements in the region. In contrast to this, the Besler Village is very close to the Iranian border and seems to have many historical and cultural similarities to Iran. Clarifying and comparing the characteristics of the settlements is important for understanding architectural culture around the Silk Road. In this paper, I discuss the relationships among climates, topographies, roads, buildings, and the lives of residents to determine the characteristics of their spatial composition.

2. Methods

As previously noted, I studied two villages in the Eastern Anatolia Region: Konaklı Village in the Palandöken District of Erzurum Province and Besler Village in the Doğubayazıt District of Ağrı Province (Fig 1). Each village has a settlement (hereinafter Konaklı and Besler Settlements) on a slope and is surrounded by mountains with few trees. I conducted document searches and field surveys in the settlements. In the document search, from the Internet I gathered information about the temperature and precipitation of the nearest city, aerial photography, topography, and outlines of each settlement. In my field surveys conducted on August 23 and 24 in 2012, many photographs were taken, and residents were interviewed when possible.

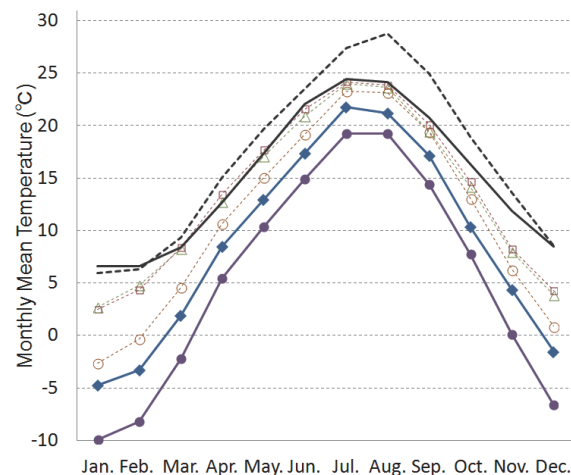


Fig 2. Comparisons of monthly mean temperatures in Erzurum, Doğubayazıt, and other cities. Both Erzurum and Doğubayazıt have lower temperatures than previously reported areas.

Erzurum, Karabük, Amasya and Istanbul (1970-2011): Turkish State Meteorological Service (2013)
Doğubayazıt (Doğubayazıt, 1963-1990) and Divriği (1964-1990): WorldClimate (2013)
Osaka (1981-2010): Japan Meteorological Agency (2013)



Fig 1. Locations of settlements under study in Turkey (Google Earth, 2013).

This paper reports Konaklı and Besler.

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3. Results

3.1. COMPARISONS OF TEMPERATURES AND PRECIPITATION

I compared the monthly mean temperature and precipitation of Erzurum City (altitude of around 1,940 m, about 20 km northeast of Konaklı Village), Doğubayazıt City (altitude of around 1,600 m, about 14 km northeast of Besler Village), and other previously reported cities (Suzuki & Okazaki, 2012a) (Fig 2, 3).

Both Erzurum and Doğubayazıt have lower temperatures than the previously reported areas. The monthly mean temperatures in winter (December to February) are below -3°C . Therefore, they are estimated to have continuous snow cover in winter based on Köppen Climate Classification (1918). Especially in Erzurum, the temperature is low and sinks to -9.9°C in January (Turkish State Meteorological Service, 2013). Both have cool climates in summer because the monthly mean temperatures are below 22°C . Konaklı's altitude is around 2,230 m, which is almost 300 m higher than Erzurum. Because the temperature decreases by 0.65°C with each 100 m of altitude (International Civil Aviation Organization, 1993), Konaklı's temperatures is estimated to be about 2°C lower than that of Erzurum. Similarly, Besler's is estimated to be about 2.6°C lower than Doğubayazıt's because Besler's altitude is around 2,000 m, which is 400 m higher than Doğubayazıt's.

The mean annual precipitation in Erzurum (408 mm, Turkish State Meteorological Service, 2013), and Doğubayazıt

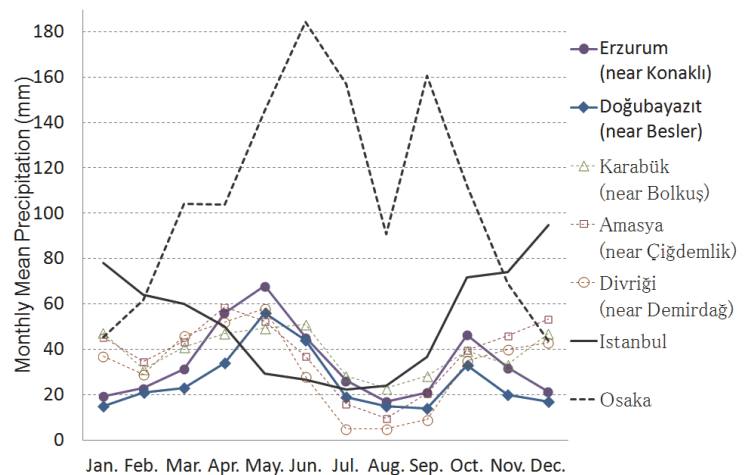


Fig 3. Comparisons of monthly mean precipitation in Erzurum, Doğubayazıt, and other cities. Mean annual precipitation in Erzurum (408 mm) and Doğubayazıt (311 mm) are low, especially in summer and winter.

Erzurum, Karabük, Amasya and Istanbul (1970-2011): Turkish State Meteorological Service (2013)
Doğubayazıt and Divriği (29 years): CautyMedia (2013)
Osaka (1981-2010): Japan Meteorological Agency (2013)

(311 mm, CantyMedia, 2013) is low. The monthly precipitation is especially low in summer and winter. The annual precipitation in Doğubayazıt near the Iranian border corresponds to that on an arid boundary (317 mm, when there is no distinguished dry season and the annual temperature is 8.9°C), as defined by Köppen (1918), and its climate is estimated to be the limit at which forests can grow.

Both Erzurum and Konaklı are categorized as Humid Continental Climates by Köppen Climate Classification. Doğubayazıt is placed near the boundary of Humid Continental and Semi-arid Climates. However, Besler probably belongs in the Humid Continental Climate classification, just like Konaklı, because the annual precipitation on arid boundaries decreases by 20 mm with each 1°C decrease in annual temperature (Köppen, 1918).

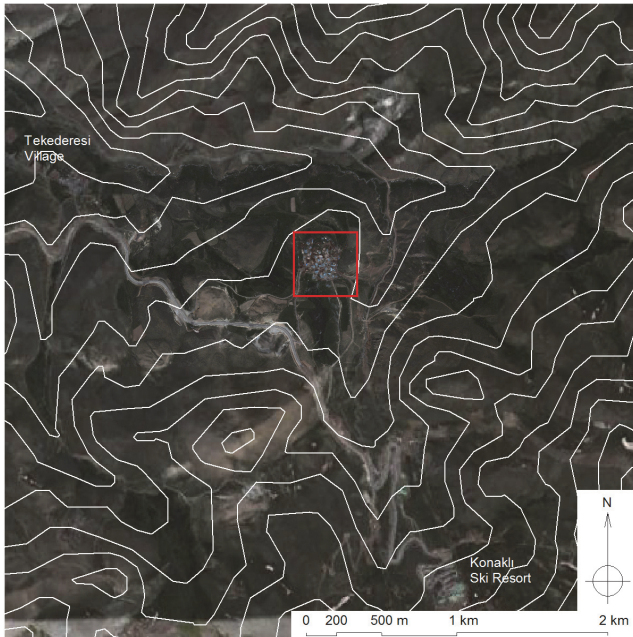


Fig 4. Aerial photograph and topography of Konaklı Village 1:50,000. See Fig. 5 for closeup in framed rectangle.

Aerial photography in 2012: Google Earth (2012) © 2013 Google, Image © 2013 DigitalGlobe Contours (50 m intervals): GeoMapApp (2013), Ryan et al. (2009) <http://www.geomapapp.org>

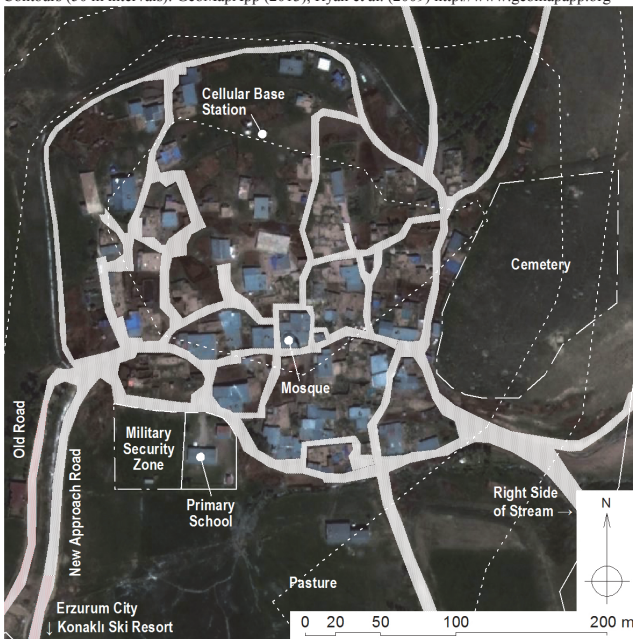


Fig 5. Closeup aerial photograph, contours, and map of Konaklı Settlement 1:5,000.

Aerial photography in 2012: Google Earth (2012) © 2013 Google, Image © 2013 DigitalGlobe Contours (10 m intervals): GeoMapApp (2013), Ryan et al. (2009) <http://www.geomapapp.org>

Below are the results of my document searches and field surveys for each settlement.

3.2. KONAKLI

3.2.1. Document Search (GeoMapApp, 2013; Google Earth, 2011; Google Map, 2013; Vikipedi, 2013b)

Konaklı Village, which is about 20 km southwest of Erzurum City, has an altitude of around 2,230 m. It is in a valley surrounded by bald mountains that are covered by snow in winter. A settlement, which was formerly called Kevgüri, is located on a low hill near the left bank of a stream curving from south to the west (Fig 4, 5). The settlement's slopes about 5° or 10°. Buildings are spread over the entire hill, and meadows cover around the hill. Houses are not found on the settlement's south side because Konaklı Settlement is the innermost settlement in the valley. Roads on both sides of the stream had directly connected to the settlement. The Konaklı Ski Resort for the 2011 Winter Universiade in Erzurum was built about 2.5 km south of the settlement. At the same time a broad road connecting Erzurum City and the resort without going through the settlement was also built on its south side. The village's population was 308 in 2000 and 284 in 2007.



Fig 6. Appearance of Konaklı Settlement to the south. Pitched roofs created a sense of unity when viewed from outside the settlement because materials of the same color are used.

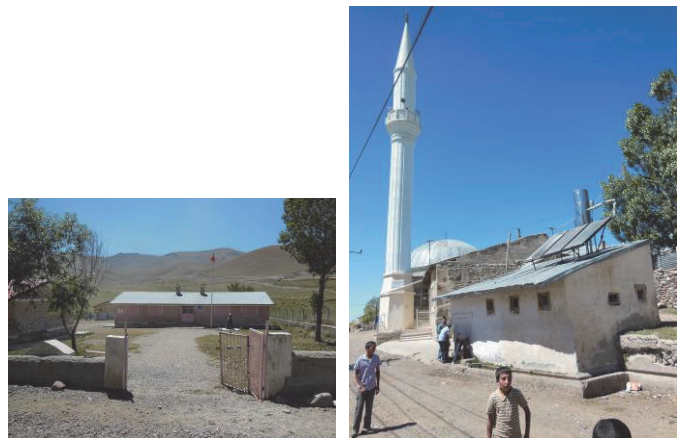


Fig 7. Primary school under a hill in Konaklı Settlement.

Fig 8. Mosque halfway up a hill in Konaklı Settlement with stone and brick masonry construction.

3.2.2. Field Survey (August 23, 2012)

Entire Settlement: The settlement stood out because the buildings were spread on the entire hill (Fig 5, 6). Trees were found on patches of the hill, but most of the slopes had none. Cattle, goats, sheep and horses were put out to pasture and on the ski slopes near the settlement. A primary school was under the hill (Fig 7), and a mosque was located halfway up it (Fig 8). A path encircled the hill. The density of buildings was relatively high on the south slope and relatively low on the north. The buildings were basically oriented on the cardinal direction. However, each turned in a slightly different direction in relationship with the slope. The inside of the settlement was mazy because its rough paths sprawled as if threading their ways through the buildings (Fig 9, 10). Few paths branched from the mosque or square, unlike the previously reported settlements (Suzuki & Okazaki, 2012a, 2012b). Most of the paths were dirt.

The settlements were dotted with small walled or fenced crofts and apiaries (Fig 11). Some of the walls and fences could be easily cleared by man. Haystacks were found on empty lots in the settlement and on the flat roofs of the buildings (Fig 12). They appeared to be winter food for the livestock. Another hill on the east side of the settlement had a fenced cemetery.

Buildings: Most of the buildings in the settlement were one story. Houses and livestock barns were not separated. Both such traditional buildings were stone masonry construction (Fig 13, 14, 15). Some of the houses and barns shared walls (Fig 16). There were only minimal land formations with low retaining walls because many buildings had ground floors, parts of which were under slopes (Fig 17).

Many of the houses and livestock barns had entrances that directly faced paths. The houses had steel doors and glazed windows, but the barns had shabby wooden or galvanized doors, and small unglazed windows. Most of the windows in the houses were rectangle, small, and unopened.

Houses and livestock barns in the region traditionally had flat roofs plastered with mud (Hara et al., 1976). However, these days, the settlements including Konaklı have many houses converted into pitched roofs with corrugated galvanized iron (Fig 18). Most of the pitched roofs were gabled or pent. Many buildings with such corrugated roofs were found not only in Konaklı but also in the numerous settlements in Erzurum and Ağrı Provinces. The pitched roofs created a sense of unity when viewed from outside the settlement because materials of the same color were used (Fig 6).

Recent houses or extensions were not stone masonry construction but brick or concrete (Fig 19, 20). The shapes of many such houses resembled stone houses. The walls had low saturation.

The mosque was built of stone and brick masonry construction (Fig 8). Except its minaret and its domed roof, it shared a similar appearance with the surrounding houses.

3.3. BESLER

3.3.1. Document Search (GeoMapApp, 2013; Google Earth, 2011; Google Map, 2013; Vikipedi, 2013a)

Besler Village is about 14 km southeast of Doğubayazıt City and about 5 km north of the Iranian border. The settlement, called Sûrbexanajorê in Kurdish (Bajarê Agırî, 2010), has an altitude of around 2,000 m and is located in a valley surrounded by bald mountains (Fig 21, 22). It is the innermost settlement in the valley, and near the confluence of two streams from west and



Fig 9. Slope path in Konaklı Settlement.



Fig 10. Slope path in Konaklı Settlement.



Fig 11. Small walled croft in Konaklı Settlement.



Fig 12. Haystack on flat roof of building in Konaklı Settlement.



Fig 13. Stone houses in Konaklı Settlement.



Fig 14. Stone house in Konaklı Settlement.



Fig 15. Stone livestock barns in Konaklı Settlement.



Fig 16. Houses and livestock barns sharing walls in Konaklı Settlement.



Fig 17. Livestock barns partly under a slope in Konaklı Settlement.

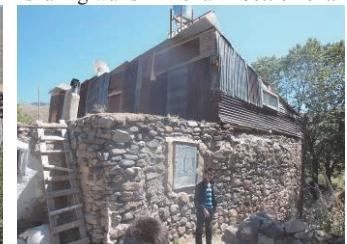


Fig 18. House converted into pitched roofs with corrugated galvanized iron in Konaklı Settlement.



Fig 19. Brick house in Konaklı Settlement.



Fig 20. Concrete house in Konaklı Settlement.

north. The majority of its houses are on east-facing slopes (about 5°) between the two streams, but parts of them spread to the

north and east sides around the valley. The village has two approaches. One is a road through the settlements on the east along the valley, and the other is a road from Dogubayazit City on the north through a mountain pass. The village's population was 196 in 2000 (Vikipedi, 2013a) and 137 in 2012 (Turkish Statistical Institute, 2013).

of the houses were raised higher naturally by using slopes. Because many of buildings were enclosed by walls, they were not clear whether or not part of them were under slopes. However, I found such buildings (Fig 28) as well as previously reported settlements (Suzuki & Okazaki, 2012a, 2012b).

Traditionally, houses were built of stone masonry

3.3.2. Field Survey (August 24, 2012)

Entire Settlement: Buildings gathered in relatively low places on the east-facing gentle slope between the two streams (Fig 22, 23). A road for approaching the settlement curved and penetrated it (Fig 24). A few trees were found around the settlement, but not on most of the slopes. Each house had a courtyard enclosed by stone walls (Fig 25). Connected houses with walled courtyards comprised a block (Fig 26). However, some houses had already collapsed (Fig 27). Paths in the settlements sprawled and were dirt. The directions of the buildings and the courtyards were basically in reference to slopes. Some of the houses spread to the north and east sides around the valley (Fig 28, 29). Pastures with livestock including horses and sheep were seen near the settlement. A mosque was in the west on a higher part of the settlement (Fig 30). A primary school was also in the west outside of the settlement (Fig 31).

Buildings: All the settlement's buildings were one story. Houses and livestock barns were integrated with walled courtyards (Fig 32) through which they were approached (Fig 33). The houses and barns shared courtyards. Many of the stone walls enclosed the courtyard and discouraged looking in from the outside (Fig 25, 33, 34). However, the ground floors of many of the houses were considerably higher than their courtyards and the floors of barns because many rectangular windows of the houses were higher than the walls that enclose the courtyards (Fig 34, 35). The floors



Fig 22. Closeup aerial photography, contours and map of Besler Settlement 1:5,000.

Aerial photography in 2011: Google Earth (2011) © 2013 Google, Image © 2013 GeoEye
Contours (10 m intervals): GeoMapApp (2013), Ryan et al. (2009) <http://www.geomapapp.org>



Fig 23. Appearance of Besler Settlement to the east. Low saturation houses and stone walls created a sense of unity when viewed from outside the settlement because they seemed to be layered on slopes and composed a unique landscape.

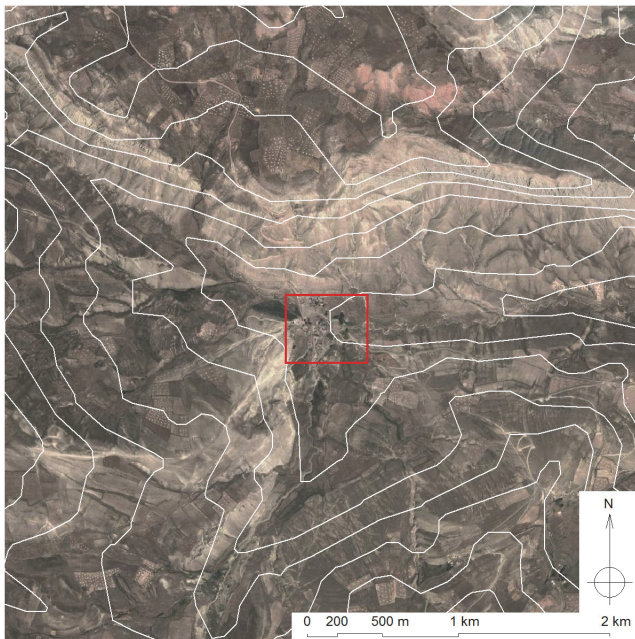


Fig 21. Aerial photography and topography of Besler Village 1:50,000. See Fig. 22 for closeup in framed rectangle.

Aerial photography in 2011: Google Map (2013) © 2013 Google, Image © 2013 GeoEye
Contours (50 m intervals): GeoMapApp (2013), Ryan et al. (2009) <http://www.geomapapp.org>



Fig 24. Curved road penetrated in Besler Settlement.



Fig 25. House with a courtyard enclosed with stone walls in Besler Settlement. The walls secured height to make it difficult to be looked in.

construction. Brick and concrete houses were also found, but their walls had low saturation. All walls enclosing courtyards were stone, even for brick or concrete houses. The low saturation houses and stone walls created a sense of unity when viewed from outside the settlement because they seemed layered on slopes and composed a unique landscape (Fig 23).

The buildings had flat roofs plastered by mud. I found no



Fig 26. Continuous houses with walled courtyards in Besler Settlement.



Fig 27. Collapsed house in Besler Settlement.

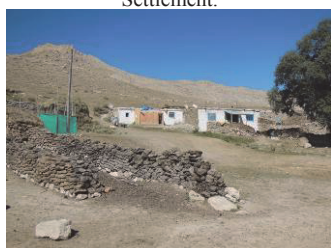


Fig 28. Houses spread north outside of Besler Settlement, partly under slope.



Fig 29. Houses spread east outside of Besler Settlement.



Fig 30. Mosque on west side and higher place of Besler Settlement.



Fig 31. Primary school on west outside of Besler Settlement.



Fig 32. House and livestock barn integrated with walled courtyard in Besler Settlement. Mosque behind had small domes, minaret and different shaped windows from the other houses in settlement.



Fig 33. House and livestock barn approached through courtyard in Besler Settlement. High stone walls enclose the courtyard and discourage people from looking in.



Fig 34. High stone walls enclose courtyard in Besler Settlement and discourage people from looking in. Windows were higher than the wall.



Fig 35. Floors of house higher than courtyard in Besler Settlement.

corrugated galvanized roofs, even though they are common in the settlements of Ağrı and Erzurum Provinces. Some of the buildings had walls or roofs partly covered by blue plastic sheets.

The mosque had different shaped small domes, minaret and windows from the other houses in the settlement (Fig 30, 32). Its courtyard was hidden from the outside because it was enclosed by high walls. The mosque was approached through the courtyard. Therefore, its spatial composition resembled the surrounding houses.

4. Discussion

4.1. SIMILARITIES BETWEEN THE TWO SETTLEMENTS

My document researches and field surveys showed the following similarities of the spatial compositions between the Konaklı and Besler Settlements:

4.1.1. Similarities between Entire Settlements

(1) Both have more than one road for approaching the settlements, which are penetrated by roads (Konaklı: Fig 5, Besler: Fig 22). In each of the previously reported farming or forestry settlements (Suzuki & Okazaki, 2012a, 2012b), roads were connected to the surrounding plowlands or forests but only one main road approached them.

(2) Few paths branch from the mosque or square, unlike the previously reported farming or forestry settlements. Specifically in Besler Settlement, the mosque was at the end of the settlement. Pastures surround the settlements, and livestock graze in them in the summer.

(3) Most of the paths are dirt. Therefore, they don't need to be swept, even though livestock walk in and out of the settlements for grazing (Konaklı: Fig 9, Besler: Fig 33).

(4) All of the private crofts and courtyards are walled or fenced (Konaklı: Fig 11, Besler: Fig 25, 26) unlike the previously reported farming or forestry settlements. The walls or fences prevent livestock from trampling the courtyards or crofts because many livestock are kept in the settlements and walk through them to graze. In fact, some of the walls and fences can be easily cleared by man in Konaklı.

(5) Unenclosed places function as public spaces and allow free passages. No paths connect the front yards of houses without doors unlike the previously reported settlements in the Black Sea Region.

(6) Primary schools with playgrounds are on the outer side of the settlements (Konaklı: Fig 5, Besler: Fig 22) as with the previously reported settlements on slopes.

4.1.2. Similarities between Buildings

(7) Most of the buildings are one story. Few two-storied buildings are found in many Turkish settlements including the Black Sea and Central Anatolia Regions (Suzuki & Okazaki, 2012a, 2012b).

(8) There are only minimal land formations with low retaining walls because many buildings have ground floors, parts of which are under slopes (Konaklı: Fig 17, Besler: Fig 28). Such buildings were also found in the previously reported settlements of the Black Sea and Central Anatolia Regions.

(9) Some houses and livestock barns share walls (Konaklı: Fig 16, Besler: Fig 32). In the previously reported settlements of the Black Sea Region, the walls of the houses were usually separated, and such small animals as dogs and chickens were kept near the houses.

(10) Traditional livestock barns are stone masonry construction, like houses (Konaklı: Fig 15, Besler: Fig 32), probably to protect the livestock from snow and severe cold (Fig 2) in a Humid Continental Climate by Köppen Climate Classification. In the settlements of the Black Sea and Central Anatolia Regions, the upstairs were wooden.

(11) Most of the windows in the houses are rectangle, small, and unopened, probably because it gets very cold in winter (Fig 2) and very dry and dusty in summer.

(12) Recent houses or extensions are not stone masonry construction but brick or concrete (Konaklı: Fig 19, 20, Besler: Fig 25, 35). The shapes of many such houses resemble stone dwellings. Since those walls have low saturation, such houses are in harmony with their surrounding buildings.

(13) Except for minarets and dome roofs, the mosques tend to share similar appearances with their surrounding buildings (Konaklı: Fig 8, Besler: Fig 30, 32). In the previously reported settlements of the Black Sea Region, their forms and colors were completely different from other houses.

4.1.3. Discussion about Similarities

I found that the similarities of the spatial compositions between the two settlements differ vastly from the settlements in the Black Sea and Central Anatolia Regions except for (6) in Section 4.1.1 and (8) in Section 4.1.2. There are great differences of suitable spatial composition between the pastoral settlements where people live next to grazing livestock in pastures, and farming or forestry settlements.

4.2. DIFFERENCES BETWEEN THE TWO SETTLEMENTS

Although the two settlements have similar climates and lifestyles, I identified the following differences of spatial compositions:

4.2.1. Difference between Entire Settlements

(1) In the Konaklı Settlement, the buildings are basically oriented on the cardinal directions, but each is turned in a slightly different direction in relationship to the slope (Fig 5). However, in the Besler Settlement, they are basically set in reference to the slopes. The buildings in Konaklı are spread over the entire hill, suggesting that Konaklı has a widely different location from Besler and the previously reported settlements on slopes (Suzuki & Okazaki, 2012a, 2012b).

4.2.2. Differences between Buildings

(2) Many of the houses and livestock barns in Konaklı Settlement have entrances that directly face paths. In contrast, in Besler Settlement they are integrated with walled courtyards from which they are approached (Fig 33). The mosque in Besler also has a walled courtyard (Fig 30, 32). No houses or mosques with walled courtyards were found in Konaklı and the previously reported settlements on slopes (Suzuki & Okazaki, 2012a, 2012b).

(3) In the Besler Settlement, many of the stone walls enclose the courtyard and discourage looking in from the outside (Fig 25, 33, 34). However, the ground floors of many of the houses are considerably higher than their courtyards and the floors of barns because many rectangular windows of the houses are higher than the walls that enclose the courtyards (Fig 34, 35). This allows views of the valley and sunlight. The stone walls create a sense of unity when viewed from outside the settlement because they seem layered on the slopes and compose a unique landscape (Fig

23).

(4) Although traditionally the buildings in both settlements had mud-plastered flat roofs, many houses in the Konaklı Settlement were converted into gabled or pent roofs with corrugated galvanized iron (Fig 18). In contrast, I found no houses with pitched roofs in the Besler Settlement. However, the pitched roofs in Konaklı create a sense of unity when viewed from outside the settlement because materials of the same color are used in them as well as in many of the surrounding settlements (Fig 6).

4.2.3. Discussion about Differences

In Section 4.2.1, (1) probably reflects the topographical differences between the settlements. In Section 4.2.2, (4) reflects the precipitations differences between them, and (2) and (3) cannot be explained by only climates and topographies. Therefore, perhaps the differences of people's lives and cultures affect them. These differences individualize each settlement and create appropriate landscapes for each area.

5. Conclusions

To understand the spatial composition of intermountain pastoral settlements on slopes in Turkey's Eastern Anatolia Region, I conducted document searches and field surveys in the Konaklı Village in Erzurum and the Besler Village in Ağrı, and clarified the following:

(1) There are similarities among the two settlements and the previously reported settlements in the Black Sea and Central Anatolia Regions: (a) primary schools on the outer side of the settlements (Konaklı: Fig 5, Besler: Fig 22) and (b) only minimal land formations because a lot of buildings have ground floors, parts of which are built into the slope. (Konaklı: Fig 17, Besler: Fig 28).

(2) On the other hand, I found many differences in spatial composition of the two settlements from the previously reported settlements. (a) more than one road approaches and penetrates the settlements (Konaklı: Fig 5, Besler: Fig 22); (b) few paths branch from the mosque or square; (c) almost all paths are dirt; (d) all private courtyards and crofts are walled or fenced (Konaklı: Fig 11, Besler: Fig 25, 26) and unenclosed places are public spaces that allow free passage; (e) almost buildings have only one story; (f) some of the houses and livestock barns share walls and are traditionally built of stone masonry construction (Konaklı: Fig 15, 16, Besler: Fig 32); (g) almost all windows in the houses are rectangular, small, and unopened; (h) recent houses or extensions are brick or concrete (Konaklı: Fig 19, 20, Besler: Fig 25, 35); but, since the shapes of many houses resemble stone dwellings and such walls have low color saturation, the houses are in harmony with the other buildings; (i) except for minarets and dome roofs, the mosques tend to share similar appearances with the other buildings (Konaklı: Fig 8, Besler: Fig 30, 32). These characteristics seem to be suitable for pastoral settlements where people live next to grazing livestock in pastures.

(3) In Konaklı where buildings are spread over the entire hill, the buildings are basically oriented on the cardinal directions, but each is turned on a slightly different direction in relationship to the slope (Fig 5). However, in Besler they are basically in reference to the slopes and the previously reported settlements.

(4) In Konaklı, many houses and livestock barns have entrances that directly face paths. However in Besler, they are integrated with walled courtyards through which they are approached (Fig 33). The mosque in Besler also has a walled courtyard (Fig 30, 32). Houses and mosques with walled courtyards were not found

in Konaklı and the previously reported settlements.

(5) In Besler, many stone walls enclose the courtyard and discourage looking in from the outside (Fig 25, 33, 34). However, the ground floors of many houses are considerably higher than their courtyards and the floors of barns (Fig 34, 35). This allows views and sunlight. Because the stone walls seem layered on slopes and compose a unique landscape, they create a sense of unity when viewed from outside the settlement (Fig 23).

(6) In Konaklı, many houses were converted into gabled or pent roofs with corrugated galvanized iron (Fig 18). However, because materials of the same color are used in the pitched roofs as well as the surrounding settlements, they create a sense of unity when viewed from outside the settlement (Fig 6). In contrast, in Besler houses with pitched roofs were not found.

The spatial compositions of both settlements are affected by being pastoral settlements where people live next to livestock that is put out to pasture. However, differences exist that individualize each settlement and create a landscape appropriate for each area.

As stated in the introduction, I also conducted document searches and field surveys on two other settlements in the Eastern and Southeastern Anatolia Regions. Next I must comprehensively clarify the spatial compositions of the intermountain settlements on slopes in the Eastern and Southeastern Anatolia Regions by focusing my discussion on the four settlements.

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