

Life with weaving noise in Fujiyoshida: A soundscape as a commons

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Abstract

This paper aims to establish that an industrial soundscape can be considered a commons through a case study on the effect of weaving noise on people living in Fujiyoshida, Yamanashi, Japan. The author conducted interviews with residents and observed the sonic environment in a district in the northeast part of Fujiyoshida. Most households in the district used to produce silk textiles using power looms in small factories located on their premises until around 1980. Some are still engaged in textile production. The residents, therefore, have the shared experience of a soundscape filled with weaving noise. Weaving noise has been considered the ‘sound of work’, as some interviewees explained that they always monitored their looms by listening to the noise. The noise has also been taken as the ‘sound of everyday life’, as indicated by several female subjects who described doing domestic work while hearing the rhythmic weaving noises. Moreover, the noise has been considered the ‘sound of the community’, as residents gathered information about their neighbours based on the weaving noises they heard coming from the premises. The results show that there are some common attitudes regarding the soundscape. These attitudes were formed by the accumulated physical experiences associated with weaving noise. In the social context, the shared attitudes stem from the fact that the noise was produced by the industry that supported the residents. The concept of a soundscape as a commons suggests the significance of applying local knowledge to soundscape management.

Keywords: soundscapes, local knowledge, industrial sound, textile industry, Japan

1. Introduction

This study aims to establish that an industrial soundscape is a commons for community members through a case study of people living with weaving noise in Fujiyoshida, Japan. Sounds that emanate from factories are usually considered annoying ‘industrial noises’ that need to be regulated. However, when an industry is deeply connected with a community, the sounds can be taken as an acceptable and even appropriate element of the area. If most members of the community share that attitude, it can be said that the community treats the industrial soundscape as a commons. Minoura (2006) showed how industrial noise was a commons for residents living in an industrial area of traditional textile production in Kyoto, Japan. In the area, noises produced by textile weaving were accepted by the residents because of shared experiences and the knowledge that the area had been supported by the industry for hundreds of years.

A few papers have addressed the sonic environment as a commons. Illich (1983) treated silence as a commons, citing an example of the first loudspeaker that reached an island: ‘Silence now ceased to be in the commons; it became a resource for which loudspeakers compete’. A survey of managers with the US National Park Service conducted by Dumyahn and Pijanowski (2011) showed that soundscapes as natural resources offer a range of benefits: natural sounds, ecosystem function, cultural and historical heritage, silence or natural quiet,

ability to communicate, well-being, and sense of place.

This study accepts the definition of soundscape provided in *Handbook for Acoustic Ecology*: ‘an environment of sound (sonic environment) with emphasis on the way it is perceived and understood by the individual or by a society’ (Truax 1999). According to Schafer (1977), one of the most important aspects of the soundscape perspective involves considering the combined physical, social, and aesthetic aspects of sound: ‘The home territory of soundscape studies will be the middle ground between science, society and the arts’. Other definitions of soundscape have been proposed. In the field of ecology, for example, it has been described as ‘the collection of biological, geophysical and anthropogenic sounds that emanate from a landscape and which vary over space and time reflecting important ecosystem processes and human activities’ (Pijanowski et al. 2011). However, such definitions seem inadequate because they tend to neglect or minimize subjectivity and intersubjectivity in the soundscape perspective.

2. The study area and its industry

The present paper focuses on the Mukaibara district, located on the northeastern outskirts of the city of Fujiyoshida. With a population of 51,689 (1 March 2013), Fujiyoshida is the largest city in the Gunnai area, which is in the eastern part of the Yamanashi prefecture of Japan (Figures 1 and 2).

The Gunnai area has been known for silk textile production since the seventeenth century. The local industry grew to become one of the largest for silk textile production in Japan during the modernization period of the late nineteenth and early twentieth centuries. While production was reduced during World War II due to the controlled economy, it developed again during the postwar period of economic growth, peaking in 1969 when the number of looms was 20,943. Production has steadily declined since then, and the number of looms was reduced to 1,721 in 2011 (Figure 3). The amount of Gunnai textile production in 2011 was 13,195 thousand m², totalling 7,816 million yens. The current main products of the industry are materials for curtains, ties, clothes, etc.

The Gunnai textile industry originally developed as a rural industry. Most factories in the area are small and family-run; only family members—or family members and a few employees—work in the factories in addition to running the farm (Figure 4). The factories are usually located on the family’s premises next to their residence (Figure 5). The primary weaving machinery used here is the power loom, which is divided into two types: shuttle looms and rapier looms (Figures 6 and 7). A shuttle loom has a mechanism to fly a shuttle in order to carry the weft threads across the warp threads; a rapier loom uses a rapier, a rod, or steel tape to pick the weft threads. Shuttle power looms spread in the Gunnai area during the early twentieth century. Rapier looms were introduced around 1980 as ‘advanced’ looms, and by 1994 half of all of 5,100 looms were rapier looms (Aono et al. 2008).

Historically, the residents of the Mukaibara district have largely subsisted on textile production and agriculture. A report published in 1982 indicated that most of the roughly 350 households in the district were engaged in weaving. The report depicted the soundscape as follows: ‘When one wakes up in the morning, the village is already filled with weaving sounds. And the rhythm of power looms is sounding loudly all the day’ (Fujiyoshida-shi Kyoiku Iinkai 1982). Textile production has decreased in the 30 years since then, but there is still more

production in Mukaibara than in other districts of the city.

3. Field study

3.1 Observation of the sonic environment

Sound levels were measured and the dominant sound sources were determined for each observation point on 16 November 2010. Twenty-two observation points were set up on numerous roads within the district. The locations on the selected roads for the observation points were stationed midway between intersections, as it was deemed the most appropriate location to observe the representative sounds of the neighbouring soundscapes (see Figure 8). Observations were conducted for five minutes at each point. Sound levels were measured by means of a RION NL-22 sound level meter. The dominant sound source type was noted for every second of each observation. The recorded sound types were classified into five categories: weaving, traffic, other anthropogenic, natural, and not identified. *Not identified* means the sound sources were too quiet to identify.

Table 1 shows the time percentages of the dominant sound sources and the A-weighted¹ sound level measurements in L_{eq} , L_5 , L_{50} , and L_{95} ². The area was found to be a relatively quiet sonic environment with L_{50} levels ranging from 35dB to 51dB (Figure 8). The prominent L_{eq} and L_5 values at point 7 were caused by a retail truck's loudspeaker.

Figure 9 shows the time percentages for the sound sources of each point on the map. Weaving sounds were the most dominant in nine of the points, most of which were near weaving factories. At point 6, however, there was a rice field between the point and the factory emitting the weaving sounds; the distance between them was about 50 meters. Since there was nothing to obstruct the sound, and because there were no other loud sounds to mask it, the sonic environment of this point was still dominated by the weaving noise in the hi-fi soundscape³.

3.2 Life with the weaving noise

3.2.1 Methods

Eight residents residing in the district were interviewed in August and September 2010 about their recognition of weaving sounds in their everyday lives. As shown in Table 2, all eight interviewees had some association with the textile industry. Five of them (B, C, D, E, and F) were engaged in textile production at the time of the interview, and one (H) was formerly engaged. One (A) was an

¹ A-weighting is commonly used to correct measurements of sound levels reflecting the response of the human ear to sounds in different frequencies.

² L_{eq} indicates the sound level indicates equivalent continuous sound pressure level, which gives a sound level of steady sound having the same sound energy as the time varying sound. L_x is the percentile exceeded sound level, which means a level that is exceeded x percent of the time. Both are used to measure fluctuating sound.

³ A hi-fi soundscape is explained as 'one where all sounds may be heard clearly without being crowded or masked by other sounds and noise' (Truax 1999).

engineer for weaving machinery. Four of the interviewees were male and four female.

Based on the interview results, the following sections describe the relationship between people's lives and weaving sounds with regard to (1) business, (2) everyday life, and (3) community. First, however, is a description of the history of weaving noise in the district.

3.2.2 Changes in the sonic environment

Many of the informants said in the interviews that most households in the neighbourhood used to produce textiles and had one or several power looms on the premises. Mr A said that 85% of the households used to weave, and Mr B said that about 380 houses out of 400 weaved until around 1985. These narrations suggest that the sonic environment was formerly one in which weaving noises were audible throughout the area.

The introduction of rapier looms had a major impact on the sonic environment. Mr C said the use of rapier looms had increased beginning around 1985. Shuttle looms make high-pitched noises as shuttles hit shuttle boxes; rapier looms don't make such noises. Mr B said, 'looms with noises decreased, and I miss it'. He described a shuttle loom as 'a loom with noise' and a rapier loom as 'a loom without noise'. On the other hand, rapier looms make loud and low-pitched noises and vibrations since they produce wider textiles at a higher speed. According to Mr A, 'The noises of progressive looms are like a tank coming', and they produce 'noise without peace'.

Several informants said that during the 1950s and 1960s many houses would weave from early in the morning until late at night. Mr C said some weaved 'from 5:00 am till 10:00 pm' while Mr B said 'from 5:00 am till eleven or twelve at night'. It was discovered that they still weaved for long time, even at the time of the interviews. Mr B said, 'I start weaving at 7:00 am and end at 8:30 pm', and Ms F said, 'I weave from around seven in the morning till the time I go to bed'. It used to be common for residents in the area to hear weaving noises throughout their waking hours, and this is still the case for people who continue weaving or live next to weavers.

3.2.3 Weaving noise as the sound of business

Weaving noise is the sound of business for people engaged in weaving since the sounds provide necessary information for conducting business. The looms are automatic and don't need to be continually watched. However, weavers have to handle the looms when the woof runs out and must be set, or some trouble occurs, such as a thread snapping. They listen to the sounds of the looms to monitor how well they are functioning. This is shown in the following narrations:

- 'When one of my looms stops, I can find it hearing the looms' (Mr C).
- 'I can point out which one stops, even if all of the nine looms are working and sounding together. My ears remember characteristics of each loom, such as whether the speed of running shuttles is slower or faster, or the noise is softer, and so on' (Mr B).

- ‘Hearing the noise, I can get what type of loom is working or that something is wrong’ (Mr G).

Mr A, who worked in loom repair and maintenance, suggested it was important to listen to the sounds for his work: ‘Sounds are important. When something is wrong, I can find some strange noise mixing with the normal constant noises. At first I detect unusual sounds, and then I go to look for what part is wrong’.

For the people living in the area, the sounds of business are associated with the sounds of subsistence. This association is evident in the narration by Ms H: ‘It had been the sound of life; that is, we had never lived a life without the noise’. This indicates that she feels comfortable hearing the weaving noise. Some informants had a different attitude in that they were annoyed by the noise but accepted it because it was their business. Ms F, for example, said, ‘I don’t like the weaving noise. It is better to live without the noise. It is just necessary for subsistence’. And Ms D stated, ‘I feel annoyed with it, but I’ve got used to hearing it for many years’.

3.2.4 Weaving noise as the sound of everyday life

Weaving production could not be separated from people’s domestic lives because most factories were family-run and located next to the residence on the same site. Women often handled domestic affairs such as cooking, cleaning, and child rearing while also weaving. Thus, weaving noises were associated with everyday life.

It was frequently mentioned that they weaved while looking after their babies.

- ‘My wife used to weave with our baby on her back. She walked around in the factory, and our baby slept. Like a conditioned reflex, his body and brain seemed to accept that. Weaving noises became a lullaby’ (Mr B).
- ‘We had our baby sleep in the factory. We gave her a piggyback for a while to put her to sleep and then placed her in the bed. She awoke when the factory stopped’ (Mr C).
- ‘I put a crib in the factory and placed my baby in it. I gave him a bottle, and sometimes his face got white with milk. I had been so busy I could not take care of my baby in those days’ (Ms D).

Another narration shows how Ms E handled domestic affairs while weaving, suggesting that weaving noises provided a rhythm for domestic life:

I can do everything—cleaning, washing, or cooking—while operating the looms. But when the looms stop, I cannot do housework, thinking I’ll do it afterward. I start to run the looms first after I wake up, and then I do cooking or washing, and I stop them when I go to bed. As long as I weave, I can do every kind of work, even if I am very busy. In those days, I could do everything by myself if I ran all of these looms and my husband went to the field.

These narrations suggest that the noises were deeply connected with the residents’ everyday lives such that they had a shared local culture of living with

weaving sounds.

3.2.5 Weaving noise as the sound of community

As shown in 3.2.2, at one time the sonic environment was such that people could hear weaving noises everywhere. Some residents associated that sonic environment with the livelihood of the community, as narrated by Mr A:

Those who live in the area used to wake up hearing weaving noises every morning, and they always heard the noises. We heard not only the weaving noises but workers coming and going. We had deep communication each other, sometimes having some tea or discussing. We had pleasant conversations, doing small talks at times.

Some respondents discussed their awareness of the noises made by others. Mr B said, 'When I couldn't hear the weaving noises of my neighbour, I got concerned about him wondering if he was all right'. He added, 'If there is no noise in our house, the neighbours probably think that something should be wrong with us'. This suggests that the noise was a source of information about one's neighbours. Ms H suggested that she was conscious of the noises being heard by the neighbours: 'It was embarrassing to stop my looms at nine at night in those days when textiles were booming. I used to feel ashamed if I stopped weaving too early'.

Most respondents said there were never complaints about weaving noises. Mr B explained, 'There's no complaint about the noise because everyone used to weave here'. Ms H, who quit weaving, also said, 'I don't think it is annoying. Everybody used to weave, so annoyances should cancel each other'. This shows that industrial noise was mundane in the area. Mr C suggested that the relationship of the community accounted for the lack of complaints: 'This village is almost like relatives, so it is all right just closing windows'. These narrations show that the weaving noises were accepted in the community.

4. Discussion

4.1. Weaving sound in the study area

It was found that weaving sounds in the study area were not always considered noise (which means 'unwanted sound'), although industrial sounds are usually treated as noise. This is partly attributable to the fact that the weaving sounds were not loud enough to cause annoyance to most residents. However, the meaning of the weaving sound in the local context is also a significant factor. The interviews suggest that the weaving sounds were understood as pertaining to business, everyday life, and community. Such meanings derived from the residents' shared experience of always hearing the power looms being operated in neighbouring houses and possibly their own houses.

These meanings are similar to those found in a study of the textile industry in Kyoto, Japan (Minoura and Hiramatsu 2003; Minoura 2006; Minoura 2007). In the Kyoto study, some residents showed affirmative attitudes toward the weaving sounds, and the noise was generally treated as symbolic and accepted in the area. In addition, these attitudes toward weaving sounds are similar to the cultural

meanings of sounds for factory workers as discussed by Bijsterveld (2006): ‘The hum of a machine could be a comforting sound since it informed them of its proper functioning’; further, the noise ‘reminded them of their earnings’.

In summary, the sonic environment of the study area was characterized by the sound of weaving, and the residents accumulated experiences in relation to it. In hearing the weaving sounds, the residents shared the local soundscape culture as a commons.

4.2. Soundscape as a commons and its management

This concept of the soundscape as a commons could affect target setting with regard to management of the sonic environment. The normal target is noise abatement, which is administered as a reduction in noise levels. However, if the local culture significantly affects the community’s response to the soundscape, another approach could be to conserve and/or design the indigenous soundscape with consideration for local culture and history. It is an alternative method of management that treats the soundscape as not simply a physical environment but also a representation of local identity.

Although the conventional administration of noise abatement is based on scientific knowledge, local knowledge should also be adopted as a basis for new approaches to managing local soundscape. As a target for management or design, there should be a focus on social backgrounds and resident interaction in addition to consideration of the physical sonic environment. It would be effective to involve residents in the processes of management.

It should also be considered that the acceptance of noise by the local culture could possibly prevent necessary noise abatement. The Kyoto study found that some residents were annoyed by the weaving noises, but they found it difficult to complain because the local culture accepted the noise (Minoura 2007). In Bijsterveld’s study, the factory workers responded negatively toward using hearing protection due to the cultural meanings of sound (Bijsterveld 2006). Therefore, taking local culture too much into account in soundscape management could have adverse effects on mental and physical health. As such, a careful mix of local and scientific knowledge should be applied in each case.

5. Conclusion

The results of the fieldwork conducted in Fujiyoshida, Japan, show that the soundscape should be a commons for residents due to the accumulated physical experiences with weaving noises and the social fact that the noise is produced by the industry that has supported the community. The concept of the soundscape as a commons suggests that it is necessary to apply local knowledge in soundscape management along with scientific knowledge.

Limitations of this research include the limited amount of time spent observing the sonic environments at each location and the limited number of the interviews conducted; however, considering that this study serves as a pilot for a future larger study, it was determined that the amount of time observing the soundscapes at each location and the number of interviews conducted were

adequate to depict the soundscape of the targeted district. Future research will include and expand on these points and also examine comparisons of other areas of weaving and different industries to discuss the management of soundscape.

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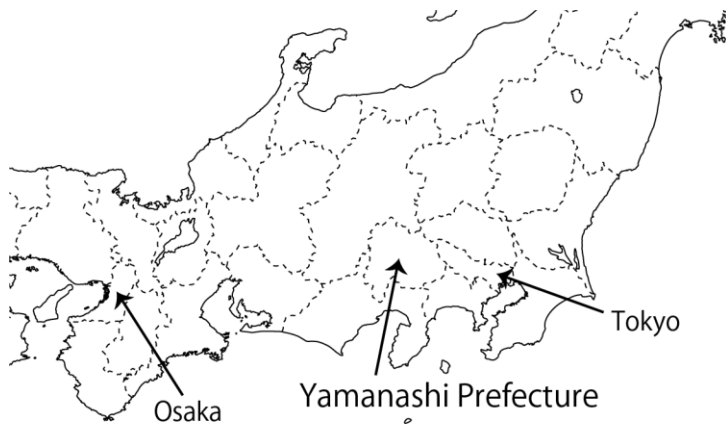


Fig. 1. Location of Yamanashi Prefecture.

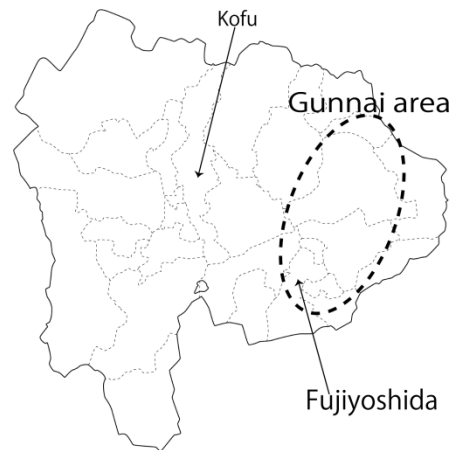


Fig. 2. Location of Gunnai area and Fujiyoshida in Yamanashi Prefecture.

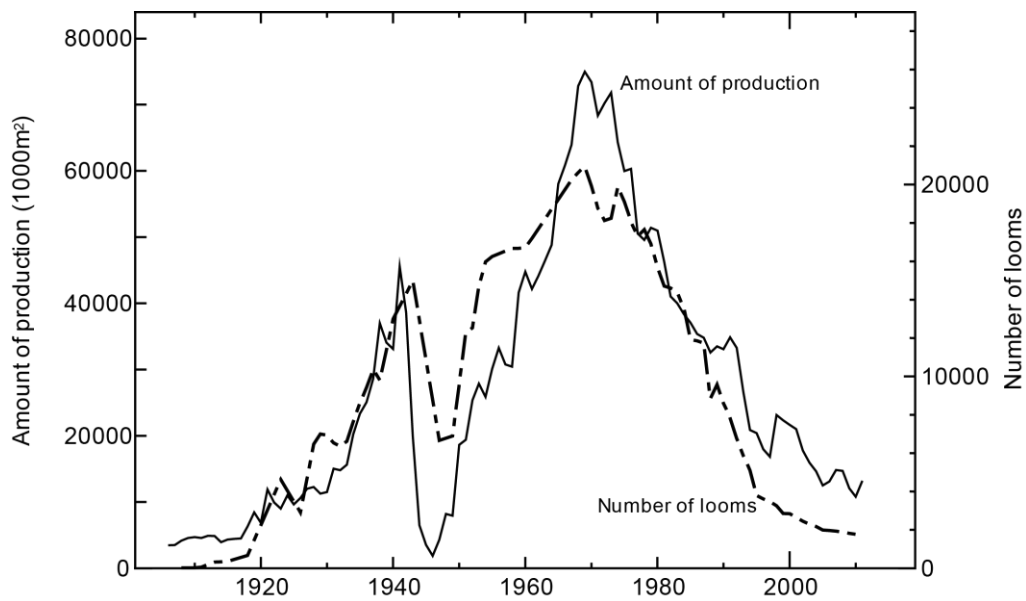


Fig. 3. Amount of production and the number of looms in the Gunnai textile industry. (Created based upon data obtained from Yamanashi Pref. Fuji Industrial Technology Centre.)



Fig. 4. A textile factory and rice field.



Fig. 5. A factory connected with its owner's residence.



Fig. 6. A shuttle loom.



Fig. 7. A rapier loom.

Table 1. Time percentage of dominant sound sources and sound levels observed in the Mukaibara district.

No.	Time percentage of dominant sound sources					Sound level (dB)			
	Weaving	Traffic	Other anthropogenic	Natural	Not identified	L_{eq}	L_5	L_{50}	L_{95}
1	98%	2%	0%	0%	0%	52	53	51	49
2	74%	2%	23%	1%	0%	43	47	40	38
3	59%	23%	18%	0%	0%	45	49	39	37
4	0%	65%	0%	0%	35%	54	60	42	32
5	94%	3%	0%	3%	0%	44	46	43	40
6	88%	0%	0%	12%	0%	42	43	40	38
7	30%	10%	60%	0%	0%	77	84	49	38
8	100%	0%	0%	0%	0%	45	46	45	44
9	0%	0%	100%	0%	0%	42	44	42	41
10	95%	5%	0%	0%	0%	51	53	48	47
11	0%	30%	2%	68%	0%	54	60	39	37
12	0%	3%	3%	0%	94%	36	39	35	33
13	0%	0%	38%	20%	42%	42	44	38	35
14	0%	4%	96%	0%	0%	58	63	45	36
15	0%	5%	95%	0%	0%	45	49	42	41
16	0%	29%	18%	0%	53%	49	53	37	34
17	0%	6%	3%	91%	0%	52	54	51	49
18	82%	13%	5%	0%	0%	51	57	46	45
19	0%	9%	0%	91%	0%	52	55	49	48
20	0%	77%	0%	23%	0%	51	54	46	45
21	95%	5%	0%	0%	0%	47	50	46	44
22	0%	8%	0%	92%	0%	53	55	50	48
Mean	37%	14%	21%	18%	10%	49	53	44	41

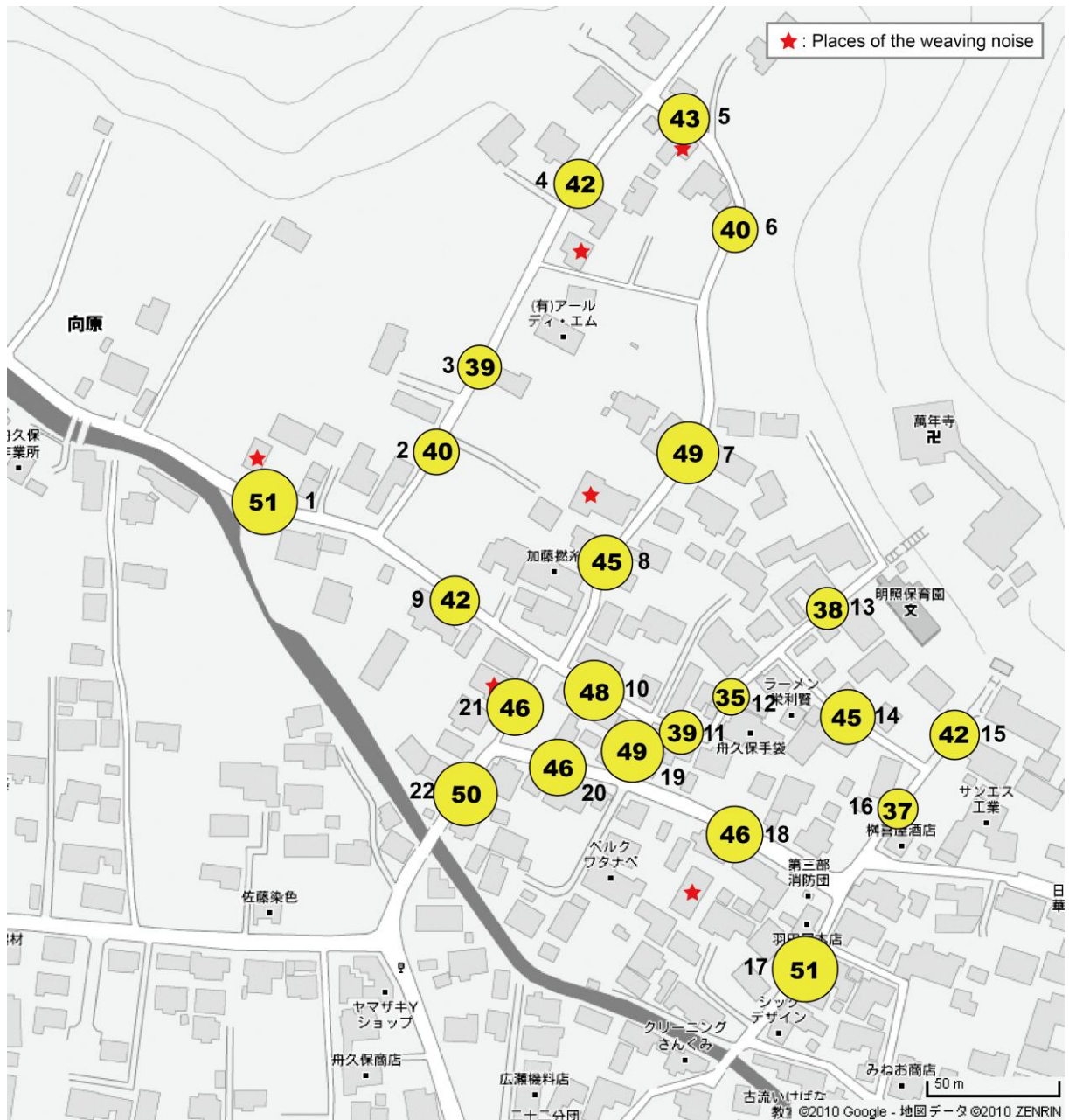


Fig. 8. A-weighted sound level measurements in L_{50} observed in the Mukaibara district. The circled numerals are the levels and the numbers outside the circles are the observation point numbers.

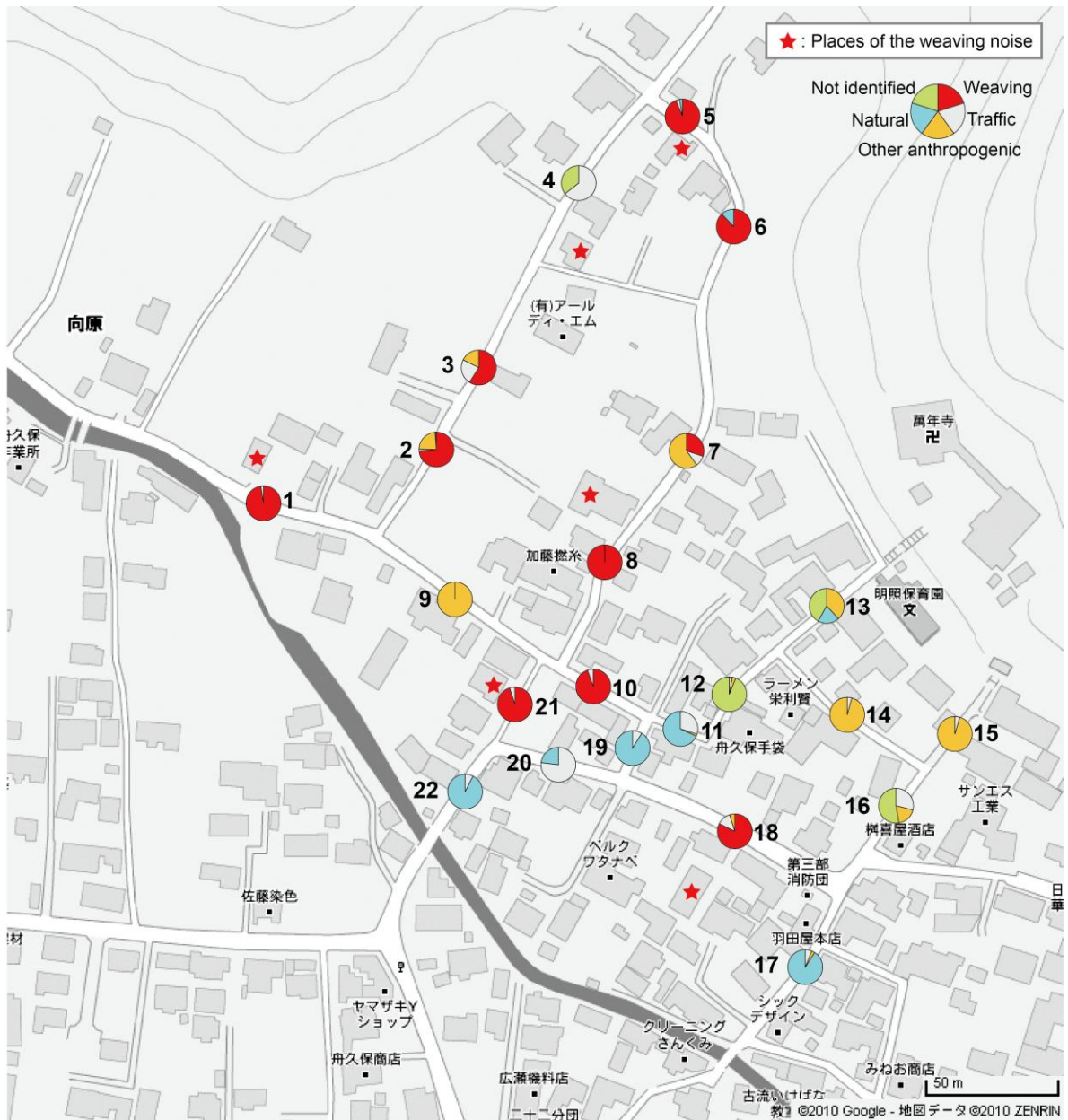


Fig. 9. Time percentages of the dominant sound sources observed in the Mukaibara district.

Table 2. List of the interviewees

Name	Date of interview	Association with textile industry	Age (at time of interview)	Gender
A	2 August 2010	A manager and engineer at a factory for maintenance and repair of weaving machinery	Unknown	Male
B	12 August 2010	A manager and weaver at a textile factory	60s	Male
C	25 August 2010	A manager and weaver at a textile factory	70s	Male
D	25 August 2010	A partner and weaver at a textile factory	Unknown	Female
E	25 August 2010	A partner and weaver at a textile factory	60s	Female
F	25 August 2010	A manager and weaver at a textile factory	50s	Female
G	17 September 2010	A manager of a textile company	Unknown	Male
H	17 September 2010	A former weaver who closed her textile factory in 1985	70s	Female