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A Soundscape of Sea Waves and Collaborative Action Research: The Case of the Nami-kozo Folktale of the Enshu-nada Sea, Japan

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ABSTRACT

This study examined rumbling emitted by the Enshu-nada Sea, with a focus on region-specific listening culture. Sea rumbling propagates over long distances in this area, where locals used its direction to predict the weather. Moreover, the connection between people and the sea is symbolized through a regionally transmitted folktale. We clarified the physical and sociocultural characteristics of sea rumbling through collaborative action research, thus demonstrating the significance of this approach in preserving and/or recovering local knowledge.

1. INTRODUCTION

This study investigated a sea-wave soundscape experienced by locals of the Enshu-nada Sea coast in central Japan (Figure 1). The sound produced by the sea wave is known for its characteristic of traveling great distances, emitting a sustained low frequency that can especially be heard during the summer season. In this paper, we refer to this drone-like wave sound as "sea rumbling," which can be regarded as a keynote sound that constitutes the "ground" of the regional soundscape.

Traditionally, locals have made predictions about the weather based on the direction of the sea rumbling. This knowledge is transmitted through a folktale in which "Nami-kozo (wave boy) tells people about the weather." Thus, the sea rumbling can be regarded not only as the "ground," but also as the "figure"; that is, a signal sound and soundmark within the region-specific listening culture [1].

It is also important to connect the sea-rumbling soundscape and region-specific listening culture to the concept of local knowledge. According to UNESCO, "local and indigenous knowledge refers to the understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings," such that "local knowledge informs decision-making about fundamental aspects of day-to-day life" [2].

From this perspective, sea rumbling along the Enshu-nada coast provides a valuable case for soundscape research aimed at clarifying the relationship between people and the natural environment, which is exemplified through the local listening culture. In this report, we describe the sociocultural meanings and physical characteristics of sea rumbling based on research conducted in collaboration with local residents [3]. By extension, we discuss issues and measures related to the preservation and recovery of local knowledge.

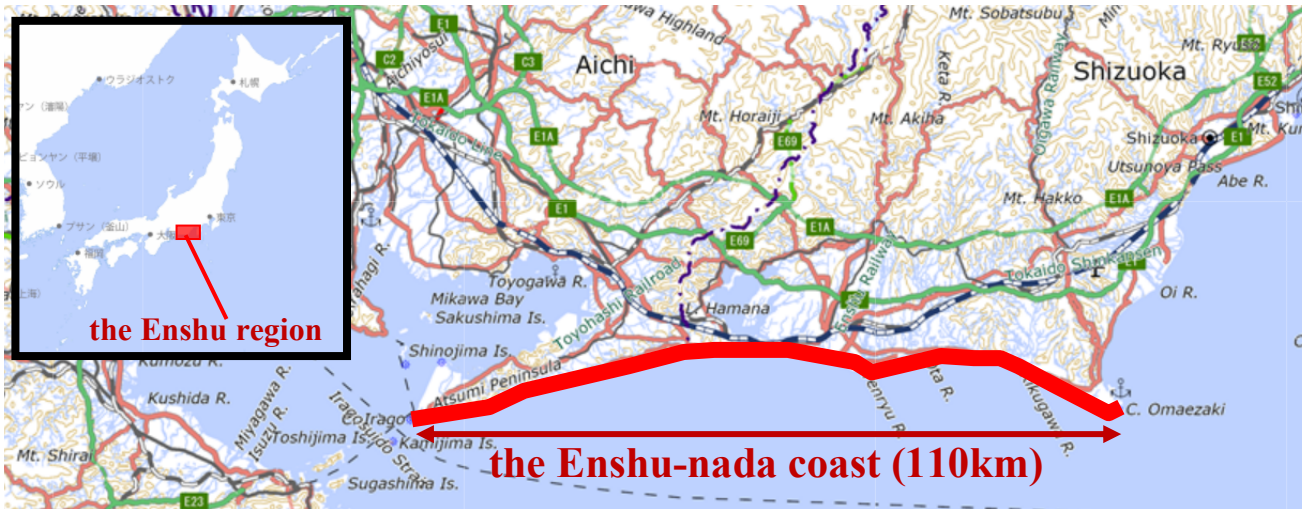

Figure 1. The Enshu region and Enshu-nada coast (https://maps.gsi.go.jp/)

2. RESEARCH METHODS AND PROCESS

The south side of the Enshu region features a long coastline measuring approximately 110 km from east to west (Figure 1). This defines the area where the Nami-kozo folktale on sea rumbling is handed down through generations.

In this study, we focused on the sociocultural and physical aspects of sea rumbling. For our sociocultural analysis, we collected documents concerning the local knowledge of sea rumbling, including the folktale. For our physical analysis, we observed and recorded sea-wave sounds using the following two sets of equipment: 1) Zoom H1n (handy recorder) and 2) TASCAM DR-60D MKII (recorder) with Audio-technica AT8022 (mic). All recordings were taken in 48 kHz/24-bit stereo. We also gathered descriptions from earwitnesses (i.e., individuals who directly heard the investigated sounds) by conducting in-person interviews at local sites and calling for submissions through our website.

This report details the results of a collaboration between us as researchers from outside the region and local residents who understood the significance of our project. We began by interviewing a local resident group about sea-wave sounds. Some members took a personal interest in our project and decided to conduct their own observations and recordings. In turn, their findings helped us select study locations and refine our research questions. In the remainder of this paper, we refer to local residents who collaborated with us as "the collaborators."

3. DESCRIBING THE SEA RUMBLING

3.1 Sociocultural Characteristics

Rumbling sounds from the Enshu-nada Sea are characterized by their propagation over long distances. Changes in the direction of these sounds are thought to facilitate predictions about the weather. As a reference for travel distance, the Nami-kozo folktale has been documented as far as 25 km from the coast. In the tale, the wave boy makes wave sounds to inform residents of deteriorations or improvements in local weather conditions. The saying has been passed down that "the thunder reaches about 10 km, and the wave about 25 km."

Before scientific weather forecasts were available through newspapers and television, sea rumbling was considered an important information source for the protection of local livelihoods. In fact, sea rumbling conveys weather changes that are strongly related to typhoons, which often hit the northwest Pacific coast during summer months. The salty sea breezes that reach land can damage agricultural crops, especially during the period of frequent large typhoons.

The basic plot of the Nami-kozo folktale is that residents returned the wave boy to sea after he had come ashore and could not return on his own; as a reward, the wave boy began to inform residents about the weather. This represents the traditional attitude of living in symbiosis with nature.

With modern developments in weather forecasting, sea rumbling has lost this function. Indeed, many of the residents we interviewed described a decline in the practice of listening carefully to sea-wave sounds.

3.2 Objective Characteristics

According to an earwitness who lived 25 km from the coast, sea rumbling was actually heard there in the past. As in the folktale, locals once used these sounds to predict the weather. However, the same individual said that rumbling could not be heard there today due to an increased level of background noise. According to observations made by the collaborators, sea rumbling was heard approximately 20 km from the coast. Figure 2 shows a map of locations where these data were obtained, including reports and observations from other earwitnesses.

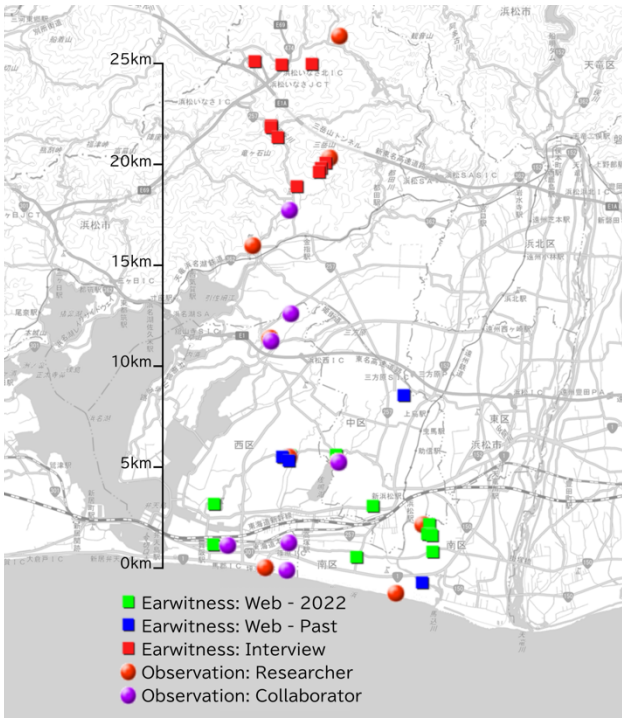

Figure 2. Locations where the study data were obtained

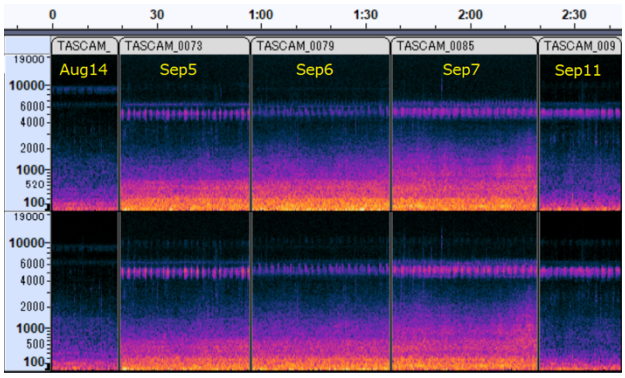

Figure 3. Sound files of sea rumbling as a typhoon approached in 2022.

Note: The Aug 14 file is a reference point for a quiet day.

Figure 3 shows the acoustic characteristics of sea rumbling that propagate over long distances. The audio files listed therein were recorded in a house located 1.5 km from the coast on the days between typhoon approach and departure. They are displayed using the Spectrogram

view function available in the Audacity audio editing software. The vertical axis indicates frequency (Hz), whereas the horizontal axis indicates the passage of time. As shown, the sustained sound in the mid-low frequency range strengthened as the typhoon approached, then weakened as it moved away.

The sea rumbling is characterized by the fact that it is heard in the same way, even when moving from one location to another. For example, we established two observation sites 2.5 km apart (both about 5 km from the coast), hearing the same low-mid frequency sound from the south. One of the collaborators also found that, while the loud traffic noise of the arterial roadway diminishes as one moves away from the source, the sea rumbling does not diminish as much.

The long-distance propagation of sea rumbling can be interpreted as a consequence of sound synthesis, as generated by waves breaking on the long 110 km stretch of shoreline. Geophysicist Wadachi [4] explains how this occurs, using linear source theory. The same reason can be applied to explain how sea rumbling was heard in the same way, even when moving from one place to another.

In the Enshu-nada Sea, waves are larger in summer and smaller in winter. Due to the frequent occurrence of strong typhoons in late summer, loud sea rumbling is heard on approach, often sounding like the beating of drums. We have not yet fully investigated this phenomenon.

3.3 The lo-fi state and decline of listening culture

The acoustic characteristics of sea rumbling shown in Figure 3 are similar to road traffic noise and aircraft noise. In fact, reports from residents as well as our own observations revealed that it was often difficult to distinguish sea rumbling from those noises. In past times, the mid- and low- frequency sounds of sea rumbling would have been much more prominent in the local soundscape, but they have become less audible and more indistinct due to the lo-fi state of the current sound environment.

This is not the only issue. As mentioned above, the weather forecasting function of sea rumbling has nearly been lost due to the widespread use of technological innovations. Thus, increasingly fewer people are carefully listening to sea rumbling in daily life, even when they know the plot to the Nami-kozo folktale.

4. COLLABORATION AS ACTION RESEARCH

Our collaborations with residents were not only advantageous in terms of data collection, but also hold significance as a form of action research, which enables direct involvement in local issues; in this case, a commitment to the recovery of listening culture. One notable outcome of our action research approach was the opportunity for residents to reconnect with the surrounding natural environment. Through the physical act of listening carefully to the sounds of waves, the collaborators seemed to gain a deeper understanding of the lives of their predecessors. During an interview, one of the collaborators told us the following: “What I want to experience is to listen to the sound of waves in my daily life. I think that's the re-creation of the life people used to live.” Through “listening,” the participants showed a deepening interest in and understanding of their own roots and regional identity.

Action research can be positioned as a soundscape design practice. In “The Tuning of the World,” Schafer wrote: “Acoustic design should never become design control from above. It is rather a matter of the retrieval of a significant aural culture, and that is a task for everyone. Nevertheless, in provoking this design concern, certain figures have important roles to play” [5]. The collaborative efforts of this study correspond well with Schafer’s statement on soundscape design.

5. CONCLUSIONS

Our sociocultural analysis identified rumbling from the Enshu-nada Sea as both an important signal to protect livelihoods and a soundmark symbolizing the relationship between people and the sea. Meanwhile, our physical analysis clarified the long-distance propagation of the sea rumbling and defined its acoustic character as sustained mid- to low- frequency.

Today, the lo-fi sound environment makes it difficult to hear the sea rumbling. At the same time, the region-specific listening culture is declining due to the widespread use of modern weather forecasting. By extension, local knowledge is declining. Our collaborative action research project has the potential to help residents recover their region-specific listening culture. In turn, this meaningful practice may lead to the restoration of local knowledge that connects people with the natural environment. In other words, this constitutes a practical application of the soundscape design.

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6. REFERENCES

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