Interpreting Winds, Waves, and Volcanoes from Okinawan Music for Place-Based Science

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The keystone of Okinawan music

• ***Ryukyu koten*** (Ryukyuan classical music) comes from the Ryukyu Kingdom (15th-19th century), Ryukyu Islands (21st-century Okinawa Prefecture, Japan; Sakiyama & Oshiro, 1995).

• ***Uta sanshin*** (three-stringed lute and vocals; Fig. 1) is key for popular *Ryukyu koten*, dance, and entertainment in Okinawa and across the diaspora in the Americas (e.g., Ueunten, 1989).

Figure 1. Illustrations of *Ryukyu koten* instruments. (a) *Uta sanshin* (three-stringed lute and vocals) will lead (b) *fwansō* (bamboo flute), (c) *kūchō* (fiddle), (d) *kutū* (zither), and (e) *tēku* (drums). Illustration by B. Kuhasubpasin.

Is science preserved in *Ryukyu koten*?

• **Place-based education** in geoscience aims to better engage students by teaching about the environment to which students are local and most connected (Semken et al., 2017).

• **Hypothesis: *Ryukyu koten* records place-based environmental lessons for Okinawans in Okinawa and worldwide, which can be spread by *uta sanshin* (e.g., Fig. 2).**

Figure 2. A *Ryukyu Koten Afuso Ryu Ongaku Kenkyuu Choichi Kai*, Hawai'i Chapter class in 'Aiea, Hawai'i. In total, the *Ryukyu koten* group serves ~300 people ages 5 - 90+ across Hawai'i and may be a diasporic audience for place-based geoscience rooted in Okinawan music.

Figure 3. Nubui Kuduchi dancer with characteristic folding fans. Illustration by B. Kuhasubpasin.

Nubui Kuduchi: song of a difficult voyage

• *Nubui Kuduchi* describes an 18th-century Ryukyuan envoy between Okinawa and Kyushu islands after the Ryukyu Kingdom became under the control of the Satsuma Domain in southern Japan (Fig. 3).

• Lyrics may record interpretable observations of climate and geology during dangerous travels.

Methods

• Compare lyrics with 20th-21st century scientific observations and literature review (e.g., Swanson, 2008).

• All authors are *uta sanshin* practitioners with the ***Ryukyu Koten Afuso Ryu Ongaku Kenkyuu Choichi Kai*, Hawai'i Branch** (J.Y Uyeunten and K.A. Odo are Master Instructors).

Listen to *Nubui Kuduchi* at https://doi.org/10.5446/69665

See associated work at https://doi.org/10.5194/egusphere-2025-139

Let's go *Nubui Kuduchi*! A pictorial tour of place-based *Ryukyu koten*

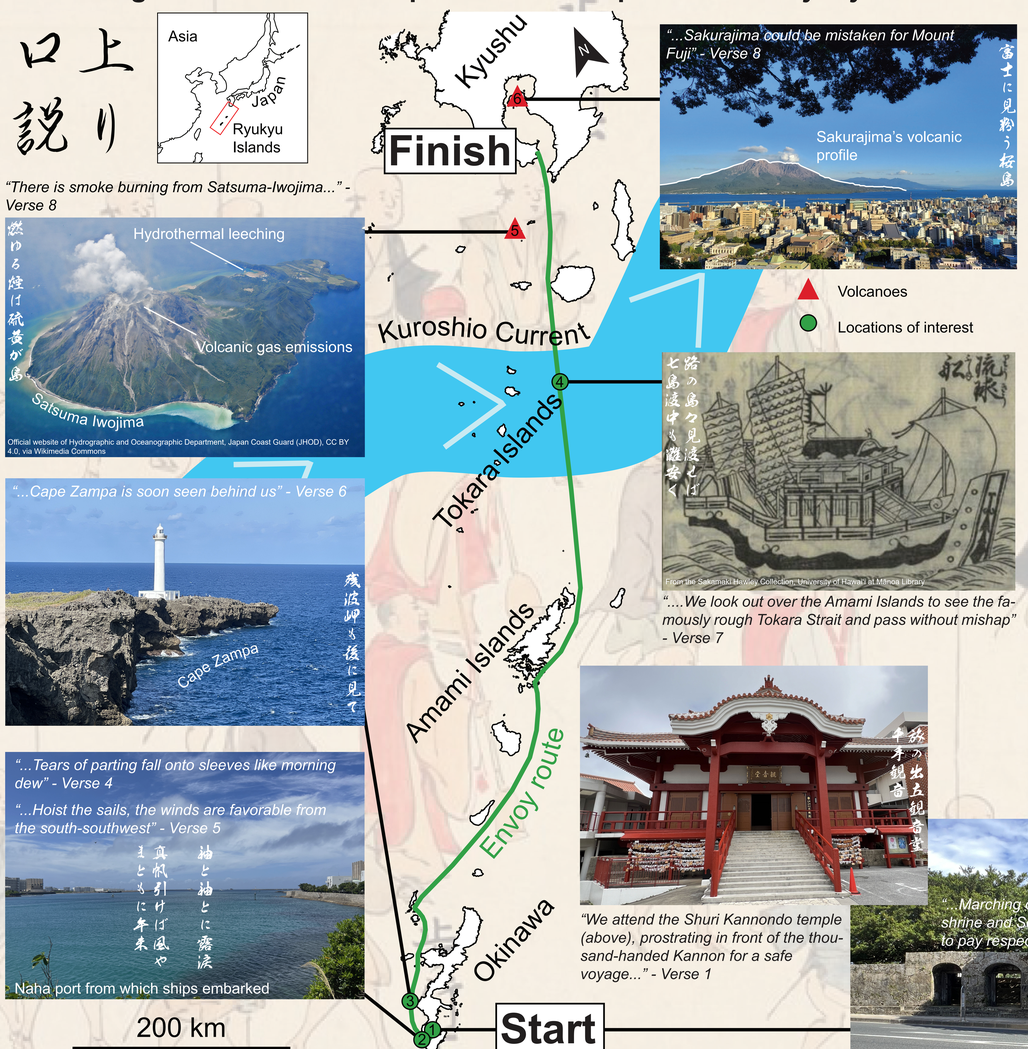

Figure 4. Map of the Ryukyu Islands and southern Japan showing places associated with *Nubui Kuduchi*, annotated with observations of climate and geology and numbered from south to north following the envoy. Relevant English translations of verses are italicized.

Relating 300 years of historical climate from lyrical wind and ocean conditions

• Prayers and tears show voyagers acknowledged the dangers of travel (approximately one year of traveling; Fig. 4).

• Records of north-bound summer envoys (Okinawa Prefectural Cultural Promotion Association, 2001) agree with Boreal summer **monsoonal south-southwesterlies** (e.g., Fu et al., 1983), implying a reliance on a regular monsoon season.

• Rough seas may be related to **typhoons** (Ikema et al., 2010; Fig. 5), relatively **high wave heights** (attributed to typhoons; Wu et al., 2014), and the **Kuroshio Current** in the Tokara Strait (Hwang, 2005; Fig. 4).

Naval History & Heritage Command, Public domain, via Wikimedia Commons

Figure 5. Shipwrecks after a typhoon in Okinawa, 1945.

Rare documentation of volcanoes in *Ryukyu koten* suggest 800 years of volcanic activity

Satsuma-Iwojima

• 12th-century epic *Heike Monogatari* describes Satsuma-Iwojima activity; *Nubui Kuduchi* bridges ~800-year gap between this and 20th-21st-century gas and ash plume activity, suggesting **magma degassing** (e.g., Kazahaya et al., 2002).

• Long-term degassing agrees with **magma convection**, supplying shallow magma reservoir with volatile-rich rhyolite for continuous activity.

Sakurajima

• Sakurajima edifice is not as conical as Mount Fuji (Fig. 6); comparison likely marks the joy of reaching land.

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Figure 6. Mount Fuji's conical edifice (compare with Sakurajima; Fig. 4).

Place-based education and science in the context of Okinawan marginalization

• Emphasize modern-ancestor-place connection to climate and volcanoes with *Ryukyu koten* (e.g., learning *uta sanshin*, visiting sites; Fig. 4).

• Critical thinking questions: Will climate change impact the monsoons our ancestors relied on? How do ancestral observations match our own?

Empowering communities

• Okinawan language banned during Japanese occupation (Fig. 7).

• Contextualizes Okinawa Prefecture's low college enrollment and standardized science test scores relative to the rest of Japan (Kakazu, 2012).

• **Positive Okinawan representation** is key to science engagement (e.g., Hawai'i indigenous knowledge; Chinn et al., 2014; Semken et al., 2017).

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Figure 7. *Hogen fuda* (dialect card) worn by students as punishment for speaking Okinawan languages.

Future work

• Continued collaboration between scientists, *Ryukyu Koten Afuso Ryu Ongaku Kenkyuu Choichi Kai*, and other Hawai'i-Okinawa partners.

• Interpret more *Ryukyu koten* and songs from folk music genres for environmental records across the atmo-, geo-, and hydrospheres.

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