

Traces of volcanic activity from the Izu-Ogasawara arc on the coast

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While walking along the beach pumice clasts are sometimes found washed ashore even though no active volcano exists nearby. During the 2021 eruption of Fukutoku-Oka-no-Ba (FOB), a large amount of pumice drifted across the ocean and attracted significant attention due to its widespread stranding on coasts in various regions, particularly in the Nansei Islands. These 2021 FOB pumice clasts were reported to have reached many coastal areas throughout Japan, including Hokkaido, within approximately one year after the eruption (Yoshida et al., 2022; Ishimura and Hiramine, 2025). In addition, the stranding of pumice was shared with photographs by local residents and tourists through social medias, becoming a geoscientific event through which volcanic activity occurring at a distant submarine volcano over 1,000 km away could be experienced on familiar beaches.

Furthermore, since October 2023, the stranding of black pumice, different from FOB pumice, has increased mainly along the coasts in the Nansei Islands. The major element compositions of volcanic glass shards contained in these pumice clasts indicate that they were derived from eruptions at Ioto volcano in the Izu-Ogasawara arc (Hiramine et al., 2025). Off Okinahama, located southeast of Ioto, volcanic activity accompanied by magma eruption was confirmed after July 2022 for the first time in approximately the past 100 years, and floating particles considered to have been produced by the eruption, as well as stranded pumice with internal temperatures exceeding 120°C, were observed in the surrounding area (Japan Meteorological Agency, 2022).

How long will this pumice persist on the coast, and what will become of it in the future? Analysis of 603 drift pumice samples collected from five beaches along the Kuroshio Current before the 2021 FOB eruption enabled estimation of source volcanoes for approximately 80% of the samples, and about 20% of the total were found to have originated from marine volcanic eruptions that occurred within approximately the past 100 years (Hiramine, submitted). These results suggest that pumice supplied to the ocean in large quantities at one time may continue to exist on coasts for at least 100 years after an eruption.

Drift pumice is found not only on modern beaches but also within sediments. At Sekinehama, Mutsu City, Aomori Prefecture, drift pumice derived from the U-2 and the To-Cu tephras, erupted approximately 6,000 years ago, has been identified (Hiramine et al., 2023). Such drift pumice preserved within sediments is expected not only to serve as a chronological marker but also to contribute to paleoenvironmental reconstruction, including past coastal environments.

Because drift pumice retains information on volcanic eruptions occurring far from the coast, records of drift pumice preserved on land may provide important clues for reconstructing eruption histories of past marine volcanoes, for which records are limited. This presentation mainly introduces drift pumice associated with recent submarine volcanic eruption events and discusses drift pumice found on beaches and within sediments, together with future perspectives.

Keywords: Drift pumice, Kuroshio Current, Volcanic glass, Fukutoku-Oka-no-Ba, Ioto

