

## **Submarine fire-fountaining eruptions: monogenetic scoria cone construction and clast vesicularity (Nishiizu, Izu Peninsula, Japan)**

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The Nishiizu Member is a  $\sim 12 \times 10^6 \text{ m}^3$ , half-dissected coastal remnant of a submarine monogenetic scoria cone in the overall andesitic Matsuzaki Formation (Shirahama Group), on the western side of the Izu Peninsula, Japan. The volcanogenic Shirahama Group is the youngest uplifted section of the Izu-Bonin arc from subduction of the Philippine plate under Japan. The brown scoria cone consists of tens to hundreds of thin to very thick beds of grey scoria lapilli and subordinate water-chilled bombs that are radially dipping (15 to 40 degrees dip) outwards a single area, considered to be the vent source. The beds of brown scoria are massive, ungraded, network-supported and overall monomictic; beds are defined by differences in grain size, and contacts are weak or indistinct. The bombs are fluidal, have thick quenched margins and some are folded and agglutinated. Lapilli and coarse ash chiefly consist of fragments of water-chilled bombs; fine ash is absent. Lithic clasts are extremely rare overall, but common (up to 10 vol.%) in the oldest beds closer to vent. Grading in vesicularity and bubble number density is ubiquitous in bombs, with overall increase in size and abundance of vesicles towards the clast core. This grading in clast vesicularity suggests submarine eruptions by volatile-coupled fire-fountaining, followed by vesicle ripening and moderate coalescence. The very thick, ungraded, poorly defined beds do not match deposition from conventional subaqueous grain flows or density currents, and may reflect a variety of primary and syn-eruptive resedimentation on unstable slopes of the scoria cone, including discrete clast rolling and sliding, and short-lived grain flows.