On 10 June 1886 Tarawera and Rotomahana (Okataina Centre, Taupo Volcanic Zone) produced New Zealand’s largest, most destructive historic eruption, opening a 17 km fissure across Tarawera Mountain and adjoining Rotomahana basin. The last 9 km transected marshlands and an intensely active geothermal system, excavating coalesced maar craters now holding modern Lake Rotomahana. Dilute pyroclastic density currents reached 6 km from their crater sources, forming lithic-rich deposits with predominantly basalt pyroclasts in varying percentages and a range of textures, colours, densities and grain sizes.

Juvenile clasts from Rotomahana have densities (vesicularities) from 900-2300 kg m\(^{-3}\) (68-18%). Rotomahana deposits are fine-grained even in proximal outcrops, so these densities are for smaller clasts (typically 10-50 mm), which are the coarsest juvenile clasts available. Most pyroclasts have multiple textural domains, with vesicles predominantly non-spherical and irregularly shaped.

Vesicle number densities (VNDs) for Rotomahana clasts are high (c. 10\(^8\) cm\(^{-3}\)), comparable to those of pyroclasts from the Plinian phase of Tarawera. Histograms of Volume-fraction size distributions show a narrow range of values, which is polymodal, with peaks around 0.04 mm and 2.0 mm. Vesicle-size distributions plot as curved segments, suggesting non-steady nucleation and growth, and are also similar to those determined for Tarawera Plinian clasts.

This similarity is surprising. Magma flux at Rotomahana was much lower than at Tarawera, seemingly precluding rapid ascent from source, yet textures suggest Rotomahana magma shared the history of that erupted from the Tarawera, with a sudden, large decompression producing high VNDs and microlite contents (>90%).