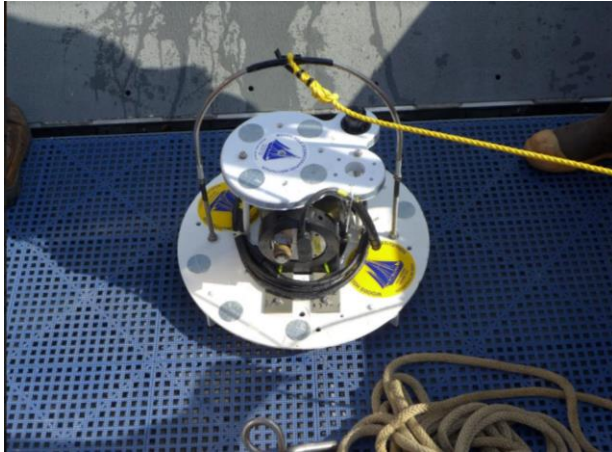


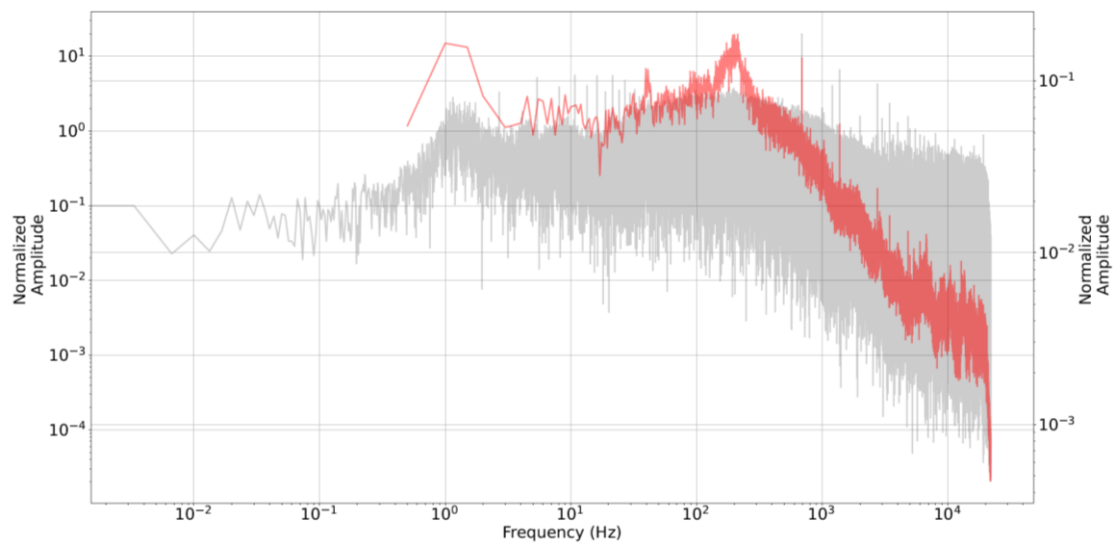
Extended data

Supplementary figures and videos

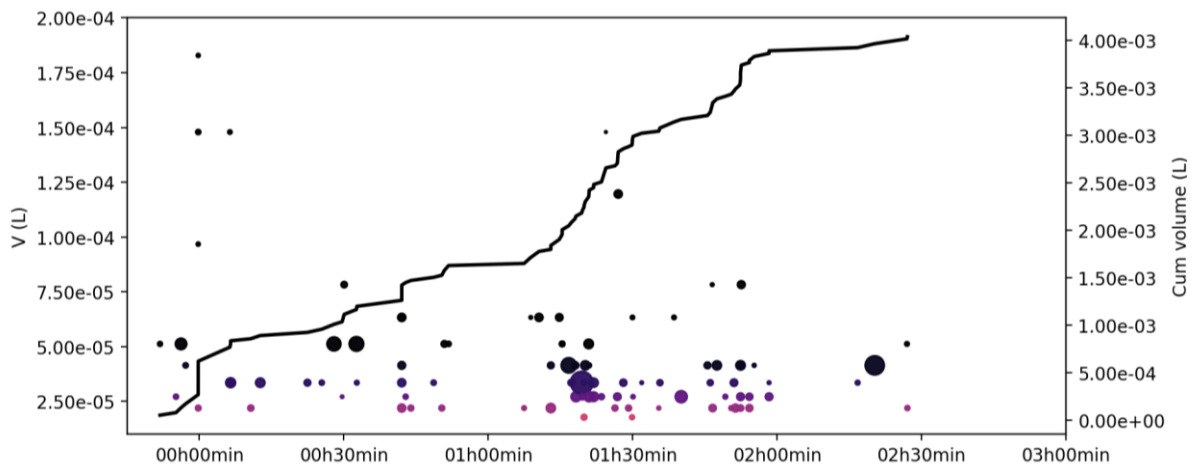
A video showing bubbles and fluids discharged into the lake is provided as supplementary material. In the video, the outer diameter of the semi-transparent snorkel at the end of the sampling device is ~5 cm.



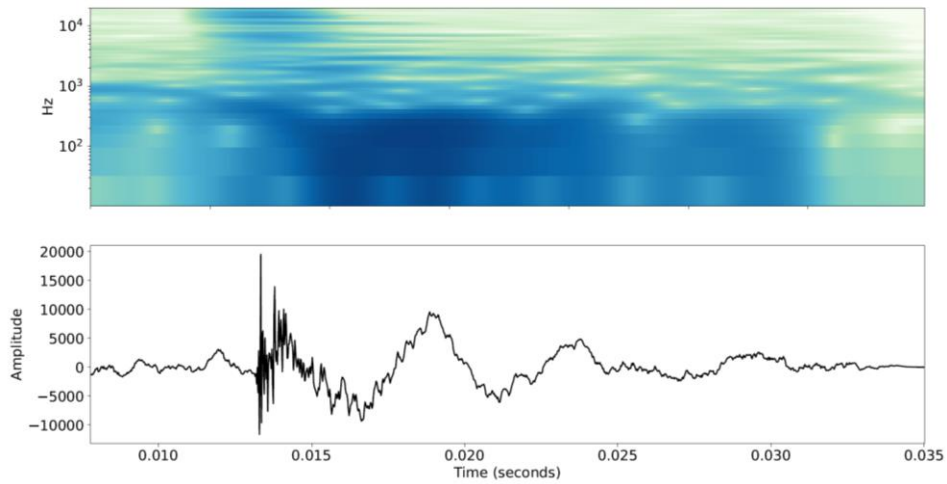
Supplementary Figure 1: Hydrophone used in this study



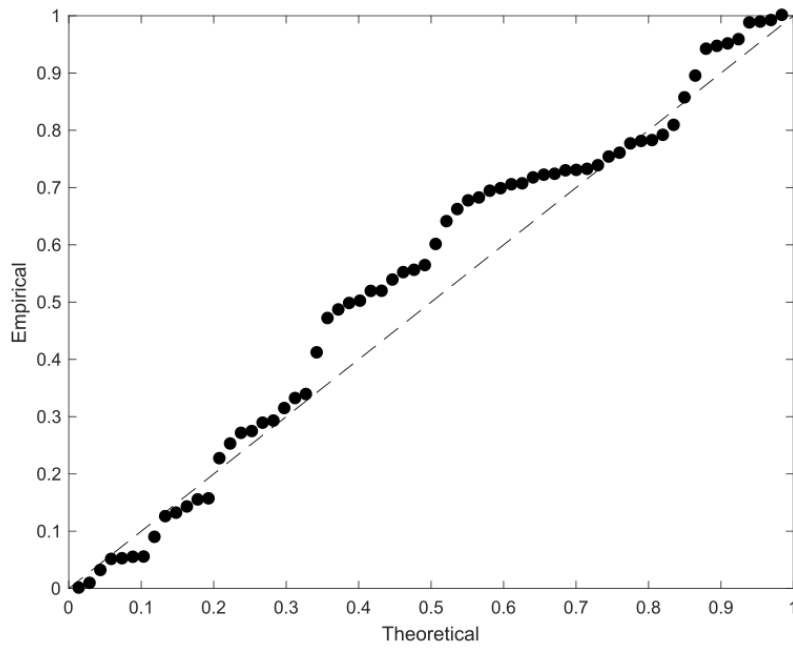
Supplementary Figure 2: Stacked spectra of bubbles (red) and ambient noise (grey) showing the resonance of the bubbles (dominant frequency of ~200 Hz, in red) and the higher frequencies (from 500 Hz to Nyquist (20500 Hz)) corresponding to nucleation.



Supplementary Figure 3: estimated volume for individual bubbles (circles, in L) based on Minnaert's relation²² and degassing rate (cumulated volumes, black line)



Supplementary Figure 4: time-frequency evolution (Fourier transform) and corresponding waveform of a bubble.



Supplementary Figure 5: Uniformity plot for bubble event catalog. The empirical distribution of the bubble events during the 3-hour interval of activity (black dots) is compared to the theoretical uniform distribution (dashed line), demonstrating that the assumption of a uniform distribution (Poisson process) is valid for this event (point process) catalog.