Analyzing the continuous volcanic tremors detected during the 2015 phreatic eruption of the Hakone volcano

Additional File 1

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**Example of a waveform and its particle motion for the volcanic tremor and apparent velocity**

The filtered velocity waveform record (1 to 6 Hz) and its particle motion are shown in Figure A1. The waveform corresponds to that shown in Figure 6 within a time window of 38.2 to 40.0 s. In order to calculate radial and transverse components, we assumed that the source of volcanic tremor is located at the vents. The relationship between the differential arrival time of the coherent phase relative to OWD station and the distance from the vents is shown in Figure A2. The waveform records shown in Figure 6 were applied. We plotted only the differential arrival times for which the normalized correlation coefficient was greater than or equal to 0.75.
Figure A1. Example of a filtered velocity waveform record (1 to 6 Hz) at OWD. (a) Vertical, radial, and transverse particle motion diagrams in the (b) transverse-radial, (c) radial-vertical, and (d) transverse-vertical directions. The waveform corresponds to that shown in Figure 6 within the time window of 38.2 to 40.0 s. The source location was assumed to be the vents.
Figure A2. Relationship between the differential arrival times relative to the OWD station and the distance from the vents. The gray lines indicate the differential arrival time as a function of the distance, assuming apparent velocities of 1.5, 2.0, and 2.5 km/s.