How to collect volcanic ash samples

Advice for the public

March 2025

How to collect volcanic ash samples: advice for the public

We really appreciate your help in collecting volcanic ash samples. These samples help us understand the properties of the ash, which is vitally important for a range of purposes from studying eruption style to forecasting eruptions and assessing ashfall hazards (for example, hazards to livestock). Timely access to remote locations may be difficult for us, and local people are ideally positioned to collect samples.

Health advice

Some potential hazards associated with collecting ash could include:

- Inhalation of dust, glass or silica.
- Skin irritation.
- Eye irritation or injury.
- Airway irritation.

While short-term exposure to airborne volcanic ash is very unlikely to be harmful to most people, some who have pre-existing respiratory conditions such as asthma may find that it worsens their breathing. These people should avoid collecting samples.

Personal protective equipment (PPE)

To minimise potential harm, we advise people collecting ash to use the following safety equipment:

- A dust mask (preferably a properly fitted N95 or P2 mask – a surgical mask or cloth mask will provide some protection).
- Long clothing (long sleeves, long pants).
- If possible, goggles without side vents to protect your eyes – safety glasses may provide some protection from airborne/disturbed ash.

Useful equipment

- Sealable plastic bags such as zip-lock.
- Permanent marker pen for labelling samples.
- A clean paintbrush (25–50 mm wide is ideal).
- Stainless steel knife or spatula.
- A clean plastic tub, e.g. a 2-litre ice cream container or takeaway container.
- A data sheet to record details on – you can print the template on page 4 or copy the information onto a sheet of paper.
- Clean sheets of A4 office paper.
- Camera/phone.
- A ruler or tape measure.

Before ashfall

If ash is coming your way, the best approach is to place a clean plastic container outdoors in an open location, away from buildings and overhanging trees, then head indoors. Write down the date and time of day when you put it out, then leave the container there until the ash has stopped falling.

After ash has stopped falling, either put a lid on the container or tip the ash into a plastic bag, give it a unique sample name (e.g. your initials and sample number), fill in details about your sample using the log sheet on page 4, then send it into GNS Science using the address on page 3. We would also appreciate photos of the ashfall and your sample location.

During ashfall

Stay indoors.

After ash has fallen

- Firstly, your health and safety are your first priority; wear the PPE identified. If it is safe to go outside, choose a good location for sample collection. An ideal location will have a hard, flat, clean and dry surface (such as a concrete path or a car roof) and be undisturbed.
- Make a vertical cut through the ash deposit and measure its thickness to the nearest millimetre. If the thickness looks variable, make several measurements and write these all down.
- Collect a sample of ash into a plastic bag by sweeping it up with a paintbrush or gently scraping it up with a spatula or knife. It may help to sweep the ash onto a clean sheet of A4 paper and then tip it into the bag. Samples of at least 50 grams (roughly ¼ cup) are ideal so these can be used for several different analyses, but even small samples of a teaspoonful or less are still useful.
- Give your sample a unique name. You might like to use your initials, e.g. AB-1. Write the sample name clearly in permanent marker pen on the bag. Just in case the writing rubs off, also write the sample name on a small piece of paper and put it inside the bag.
- Fill in a sample log sheet for each sample using the template on page 4. We would also appreciate photos of the ashfall and your sample location.
- Send your sample to GNS Science using the address on page 3. Email photos to the email address on page 3.

Measured-area ash sampling

This kind of ash sampling is a bit fiddlier to do but gives important information to help understand the eruption and its impacts. If you have time, a measured-area sample would be extremely valuable to us.

How to collect a measured-area sample

For ash deposits less than 1 cm deep:

Measure out a square on a flat surface of 30 x 30 cm or similar. Record this area measurement. Scrape away ash from the margins outside the measured area (see image below). Collect all ash inside the square and put in a bag for us to weigh in the lab.

For ash deposits more than 1 cm deep:

Use a smaller square such as 10 x 10 cm. Record this area measurement. Scrape away ash from the margins outside the measured area. Collect all the ash inside the square and put in a bag for us to weigh in the lab.

Collecting measured-area samples, Alaska.
Photo: Alaska Volcano Observatory.

Further resources

- General information about impacts of volcanic ash from the USGS: https://volcanoes.usgs.gov/volcanic_ash/
- NZ-specific information about ash fall and impacts: https://www.gns.cri.nz/our-science/natural-hazards-and-risks/volcanoes/ash/
- Advice from Health New Zealand on keeping safe from volcanic emissions: https://info.health.nz/keeping-healthy/healthy-homes-environments/protecting-health-natural-disaster/keeping-safe-from-volcanic-ash#:~:text=Health%20hazards%20of%20ashfall&text=Volcanic%20ash%20is%20harmful%20when,wear%20protective%20clothing%20if%20outside
- Volcanic Activity Public Health Information Sheet: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Finfo.health.nz%2Fassets%2FEnvironmental-health%2FVolcanic-activity.docx&wdOrigin=BROWSELINK
- One-stop shop about health impacts of volcanic activity: www.ivhhn.org
- Advice from NEMA and Civil Defence on preparing for, responding to and recovering from volcanic activity: https://www.civildefence.govt.nz/cdem-sector/consistent-messages/volcanic-activity

How to send your samples to GNS Science

Put your sample or samples, together with a log sheet for each, in a mailing bag and address it to:

Volcano Team: Ash sample
GNS Science
Private Bag 2000
Taupō 3352

Phone: 07 374 8211
Email: ashfall@gns.cri.nz

Thank you for your contribution to volcano science in New Zealand!

These instructions were developed in collaboration with disaster environmental health specialists at Massey University.

Sample log sheet

Please fill in a copy of this form for each sample. You can print this page and fill it in, or copy the information onto a piece of paper to include with each sample.

Sample name (e.g. AB-1):	
Sample location (either street address or, if possible, GPS coordinates):	
Date of collection:	
Time of collection:	
Weather conditions at time of sampling:	
Brief description of sampling site and surface (e.g. concrete path):	
Ash deposit thickness in mm (write down all measurements if you made several):	
Time since the ash stopped falling, if known:	
Any observations about the ash deposit, e.g. surface damp	
Record dimensions (cm x cm) of any measured-area sample:	
Other observations? (e.g. any unusual sounds, strength of wind)	
Your name and contact details in case we have any questions about the sample (optional)	

Thank you for your contribution to volcano science in New Zealand!