

Dust Deposition Trap Processing Protocol

This document describes the method for collecting dust deposition trap samples and obtaining sediment weights using a wet sample collection method.

Equipment needed in field:

- Adjustable tongue-and-groove pliers
- Clean dust deposition trap with travel lid and bouffant cap
- 12" spirit level
- Permanent marker
- Re-sealable plastic bags
- Dust Deposition Trap Data Sheet
- Pencil for writing on data sheet

Equipment needed in lab:

- Dust Deposition Trap Data Sheet
- 400 ml glass beakers (3)
- Supply of deionized water
- Squirting wash bottle
- Fine-tipped forceps
- Latex or vinyl lab gloves
- Electronic balance with resolution of 0.0001 g, on a stable surface
- Metal spatula
- Plastic vials (16 dram) for archiving samples (3)
- Permanent marker to label plastic vials
- Marble excluder (250 ml plastic bottle with narrow end cut off)
- Salad spinner
- Drying oven set at 60°C
- Food-grade white vinegar

In the field:

1. Collect any marbles that may have fallen to the ground. Do not return them to the trap. Place them in a re-sealable plastic bag and return them to the lab to be washed.
2. Record collection date on Dust Deposition Trap Data Sheet.
3. Remove tube (bird deterrent) from rim of pan and set aside.
4. Loosen and remove steel pipe cap, nut, and washer that fastens deposition trap to the mounting assembly.
5. Take travel lid off replacement pan and immediately secure lid and bouffant cap on the dust deposition trap being retrieved from the field. Label bouffant cap with corresponding trap ID (DDT1, DDT2 or DDT3).
6. Place a clean dust deposition trap on mounting assembly and secure it with hardware. Ensure the dust deposition trap is level by setting spirit level in two perpendicular directions across top of trap. Attach steel pipe cap and bird deterrent tubing.
7. Repeat these steps for each dust deposition trap across the Network site.
8. Transport the collected dust deposition traps to the lab for sample processing. Keep traps upright during transport.

In the laboratory or office:

1. Wear latex gloves to prevent contamination of marbles by body oils.
2. Record three glass beaker numbers in the "Beaker #" column on data sheet, and match each beaker to a dust deposition trap.
3. Weigh each empty, clean, dry beaker on a calibrated electronic balance and record weights in the "Empty Beaker wt. (g)" column on data sheet.

4. Remove travel lid and bouffant cap from dust deposition trap.
5. Position marble excluder over the center hole of the aluminum marble basket, thus preventing marbles from falling into the cake pan when the basket is removed.
6. Temporarily remove marble basket from pan.
7. Remove any visible insects, arthropods, and other foreign material (i.e., plant litter, or other non-soil debris) >5 mm in the longest dimension from the sediment sample using fine-tipped forceps.
8. Return marble basket to the cake pan.
9. Using a squirt bottle of deionized water, thoroughly wash soil from marbles and marble basket into the lower portion of cake pan.
10. Remove the marble basket and set aside.
11. Pour liquid contents of cake pan (deionized water + soil) into a pre-weighed glass beaker.
12. Give the pan a final rinse into the pre-weighed glass beaker.
13. Place glass beaker in a drying oven at 60°C overnight or until all water has evaporated.
14. After beakers have dried, remove from oven and allow to cool to touch (~ 10 minutes).
15. On a calibrated electronic balance, weigh beakers and record weights in the “Beaker + sediment oven-dry wt. (g)” column on data sheet.
16. If sediment sample will be retained (recommended for further analyses), scrape out sediment into an appropriate plastic vial using a metal spatula and/or soft, clean brush. Record in the “Sample archived (yes or no)” column on the data sheet if the sediment sample was, or was not, retained for archiving. Record the sample ID (Site, Dust Deposition Trap ID, Date Collected, and Number of Days Deployed) on the plastic vial using permanent marker.
17. If sample is compromised for any reason (trap was disturbed or damaged in field), place a checkmark in the “Sample compromised” column on data sheet. Explain in the Notes section what happened to those samples.
18. Repeat steps 1 through 17 for each dust deposition trap collected from the Network site.

Cleaning the dust deposition traps and beakers:

19. To clean dust deposition traps:
 - a. Wear latex gloves.
 - b. Place marbles in salad spinner, wash them thoroughly with deionized water, then spin to dry. If there were fallen marbles collected from the soil surface at the sample site, add those to the rest of the marbles at this stage. Repeat washing and rinsing as necessary until marbles are clean. Note that marbles should already be very clean from sample collection. This step provides a final assurance that they are clean and can be reused in the field.
 - c. Rinse empty marble basket with deionized water and hang to dry.
 - d. Rinse pan with deionized water and hang to dry.
 - e. Place clean dry basket into clean dry pan and add clean dry marbles.
 - f. Cover each pan with a plastic travel lid and secure it with a bolt and wingnut.
 - g. Cover the complete assembly with a bouffant cap to ensure dust does not enter the dust deposition trap whilst being stored or transported for redeployment.
20. To clean glass beakers:
 - a. Fill beaker to capacity with deionized water.
 - b. Squirt a small amount of white vinegar (~ 25 ml) in each beaker.
 - c. Allow to stand and soak for 24 hours.
 - d. Scrub beaker with a large bottle brush and thoroughly rinse inside and out with deionized water.

e. Hang beaker upside down to dry.