

# Measuring dust movement

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*This note presents a simple and cheap method to gauge the quantity of suspended soil in the atmosphere during a dust storm.*

This is an opportunistic method to get an assessment of the intensity of wind erosion. It is not as accurate as a high volume dust sampler, but it is cheaper and is based on the simplest of technologies. Results can be used to raise awareness and to assist publicity as well as providing monitoring information

## Equipment

- Collection tray:  
For example, a 2L microwave casserole cooker with 180mm diameter (internal measurement) round cooking tray with lid (radius,  $r = 0.09\text{m}$ )
- Bird wire
- Clean screw-top glass jars (eg squat vegemite)
- Spray bottle
- Oven for drying
- Weighing machine to weigh to nearest 0.1 gram

## Method

### Dust collection:

Use cooking tray as a dust collector. Place in a carefully chosen position where it can collect dust from the atmosphere with minimal disturbance or contamination. Use the same location rules as you would for siting a rainfall gauge, viz:

- avoid places of wind turbulence.
- use an elevated position where available to minimize disruption
- cover with bird wire to keep thirsty and bathing animals away.

### Operation:

- Half fill tray with water.
- Top up as appropriate to keep up with evaporation
- Clean out and replace water about once a week where no dust events have occurred.
- Have a weighed jar ( $W_1$  weighed without lid) available for collecting trapped dust.

### Dust storm:

- Record date and duration of storm.
- At end of event visually determine if there is enough dust for measurement.
- If so, very carefully tip off as much water as you can without losing collected dust.
- Transfer slurry into the previously weighed glass jar using spray bottle with nozzle adjusted to a fine jetting spray. (A funnel might be useful here). Use as little water as possible to make measurement faster and simpler.
- Secure lid for transport.
- Replace water in tray ready for the next event.

### Measurement:

- Place jar (without lid) into an oven running at about  $100^\circ\text{C}$  and let it evaporate to dryness.
- Cool and weigh ( $W_2$ )
- As an alternative to an oven, the jar could be evaporated-to-dryness in a warm room which may take 3 or 4 days.

### Calculations

Dust falling (gram per  $\text{m}^2$ ) for the event =  $(W_2 - W_1) \div \pi r^2$

(For the above cooking tray:

$$\pi r^2 = 3.1416 \times 0.09^2 = 0.02545)$$

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