

Ambient Air Quality in Otago

Particulate Matter (PM₁₀) monitoring results

2008

Key points

- Air Zone 1 towns experienced between 32 and 75 high-pollution days this year, up substantially from last year.
- Milton recorded 46 high-pollution days during the winter.
- Except for Arrowtown, the winter averages were higher than last year.
- Ranfurly was the only continuously monitored site to record no high-pollution days.
- Due to the weather patterns high-pollution days were recorded over a much longer period than last year: late-April until mid-September.

Why do we monitor PM₁₀?

Breathing high levels of PM₁₀ particles has been linked to adverse health effects, especially for the elderly, the very young, and those with existing respiratory illnesses like asthma. Many of Otago's centres experience high levels of PM₁₀ during the winter months. If these levels are likely to exceed the National Environmental Standard (NES) for PM₁₀, then we are required to monitor the PM₁₀ levels.

Winter 2008

The Otago Regional Council (ORC) monitored PM₁₀ levels in ten locations through the winter of 2008 – Alexandra, Arrowtown, Clyde, Cromwell, Ranfurly, Milton, Mosgiel, Central Dunedin, South Dunedin and Oamaru. In addition, monitoring was started in Lawrence on 15 August.

High levels of PM₁₀ (greater than 50 µg/m³) were reported in nine of these locations, with only Lawrence and Ranfurly recording no high-pollution days.

The table below shows the number of high-pollution days (in exceedance of the NES) in each centre as well as the average and two highest daily PM₁₀ values recorded this year.

Site	Number of high-pollution days (Jan 1 – Sept 30)	Winter average (µg/m ³)	Highest two daily values (µg/m ³)
Alexandra	75	60	150, 122
Arrowtown	38	43	126, 109
Clyde	39	38	104, 91
Cromwell	32	34	109, 105
C. Dunedin	9	26	70, 66
Milton	46	46	141, 141
Mosgiel	9	25	108, 77
Oamaru*	3	22	54, 51
Ranfurly	0	20	39, 39
S. Dunedin+	1	22	64, 40

NOTE: For the purposes of this report, winter is defined as June, July and August inclusive.

* Monitoring started 19 June, + monitoring conducted 1 day in 3.



The National Environmental Standard (NES)

The NES for PM₁₀ is a nationwide regulation designed to protect human health. It is a 24-hour average of 50 micrograms of PM₁₀ per cubic metre of air (50 µg/m³).

The role of the ORC is to achieve air quality that does not exceed the standard more than once a year throughout Otago towns by 2013.

Air quality monitors

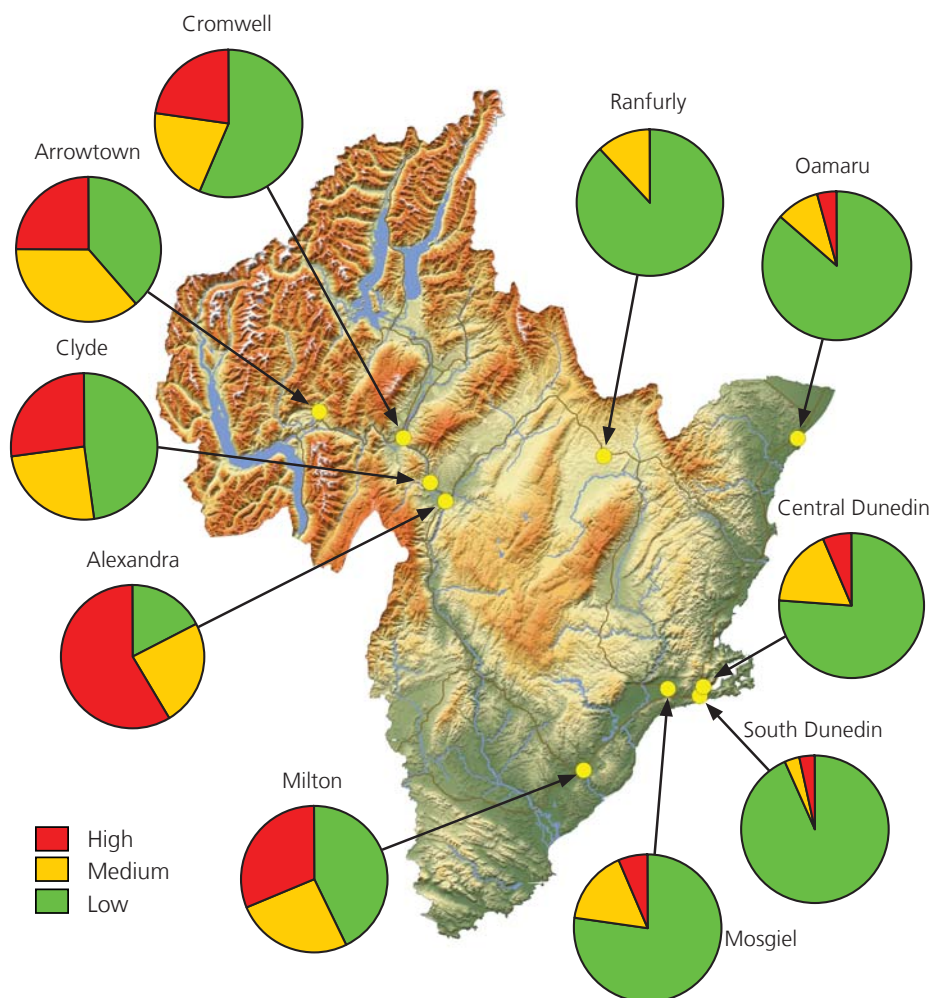
Most sites are monitored with automated Beta-Attenuation Monitors that measure hourly averages. These hourly values are then averaged over the day (midnight to midnight) to give a daily PM₁₀ value.

In addition, two sites are monitored every third day using a High-Volume sampler: South Dunedin and Lawrence. These monitors measure the average concentration of PM₁₀ over the entire day sampled.



PM₁₀ monitor in Oamaru.

Summary of 2008 air quality results



Percentage of winter days that were high, medium or low pollution days. A high-pollution day is one that exceeds the NES for PM₁₀ (50 µg/m³), a medium-pollution day is over 33 but under 50 µg/m³, and a low-pollution day is under 33 µg/m³

Central Otago and the Queenstown Lakes District

Monitoring in the four Air Zone 1 towns showed similar levels of PM₁₀ in Arrowtown, Cromwell and Clyde this winter, with Alexandra having markedly worse air quality than the other centres.

Alexandra showed the worst air quality in the region this winter with the highest average PM₁₀ level (60 µg/m³), the highest daily value (150 µg/m³), the highest percentage of winter days that were high-pollution days (59%), and the most exceedances this year up until 30 September (75).

Arrowtown showed lower levels of PM₁₀ than last winter, but still had a significant number of high-pollution days. Up until 30 September, there were 38 high-pollution days and a high proportion of medium-pollution days.

The two Central Otago towns that began continuous monitoring this winter, Clyde and Cromwell, showed similar PM₁₀ levels to Arrowtown. Each recorded over 30 exceedances, with their highest daily values being over 100 µg/m³ and average winter values of 38 and 34 µg/m³, respectively.

The second winter of monitoring in Ranfurly again showed no exceedances of the NES, with the highest daily value this winter being 39 µg/m³. Despite it being the coldest centre monitored this winter, only 12% of days were in the medium category.

Coastal Otago

The coastal sites showed a relatively distinct pattern to those further inland. For the most part, they had less extreme and less frequent high-pollution days.

However, monitoring in Milton this winter showed PM₁₀ air pollution levels similar to those seen in the inland Air Zone 1 towns. It recorded the second highest average winter PM₁₀ level of 46 µg/m³ and the second highest number of exceedances this year (46). Under clear conditions, temperatures in the town dropped close to those experienced in Alexandra.

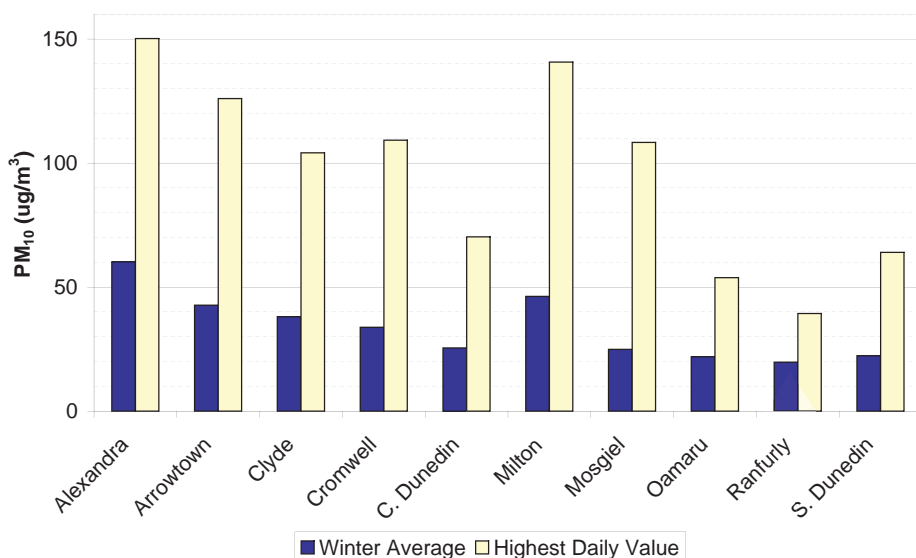
Mosgiel recorded a total of nine exceedances this year, up from four last year. Exceedances occurred every month from May through to September, inclusive. This site shows that the highest hourly readings are in the morning from 8-10 am.

Central Dunedin experienced a total of nine high-pollution days this year, much more than the two recorded last year. Most of these occurred between mid-June and mid-July, but two were reported in mid-September. This site is quite different to the other sites in that peak levels occur during the daytime and not during the evening and morning periods. This site also frequently shows moderate levels of PM₁₀ through the summer months.

Intermittent sampling (one day in three) at the South Dunedin site recorded one high-pollution day during the winter. If sampling was conducted every day, there would likely be a greater number of high-pollution days recorded. The average level of PM₁₀ over the winter was 22 µg/m³ and the highest value recorded was 62 µg/m³.

Continuous sampling began on 18 June in Oamaru and three high-pollution days and nine medium days were recorded up until 30 September.

Intermittent monitoring started on August 15 in Lawrence, in conjunction with Lawrence Area School. Of the six days monitored during August, there were no high-pollution days, with the highest value being 31 µg/m³ on 21 August.



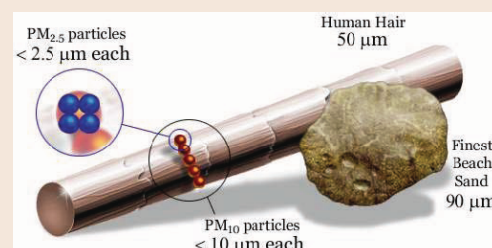
Average winter PM₁₀ level and the highest daily value recorded at each site.

What is PM₁₀?

PM₁₀ refers to really fine particles in the air that are created from both natural and human sources.

In Otago, these include smoke from domestic heating and outdoor burning, exhaust from motor vehicles, industrial discharges, sea salt, dust and pollens.

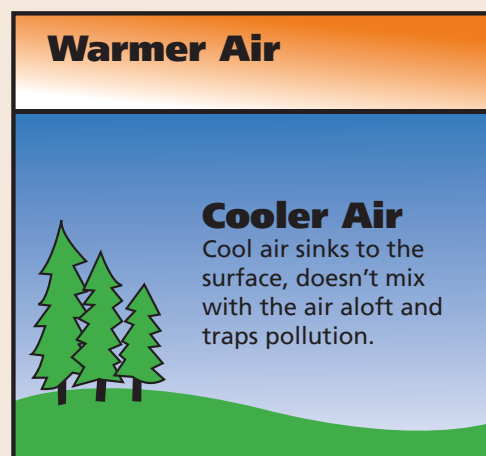
The PM stands for particulate matter and the ₁₀ refers to the fact that these particles are smaller than 10 micrometres across; about a fifth the width of a human hair.



Weather effects

In addition to the amount of particulates released into the air, the weather plays an important role in air quality.

A temperature inversion is where the air at the surface is cooler than that above. This has the effect of trapping smoke and other particulates at the surface.



Temperature Inversion

They usually form under clear skies when there is not much wind. So Central Otago, with its sunny winter days and clear nights, regularly gets inversions.

What the ORC is doing

Policy

We have designated three Air Management Zones throughout Otago to help implement policies to improve your air. For more information on your Air Zone, see our webpage www.orc.govt.nz/airinfo

These policies include regulations on the types of heating appliances able to be used, in addition to restrictions already in place on outdoor burning.

Monitoring

We continuously monitor PM₁₀ levels in 11 towns and cities around the region where high-pollution days are expected, to gain an accurate picture of the air quality in each centre.

Next winter a continuous air quality monitor will be installed in Balclutha and monitoring will continue at all sites monitored this year with the exception of Ranfurly. Monitoring in different locations will continue in Mosgiel and Dunedin to identify the areas of worst air quality.

Information

We maintain a website so you can view the air quality and meteorological conditions from the previous day and the previous 180 days: www.orc.govt.nz/airinfo

During the winter we produce weekly reports on the air quality throughout the region that you can receive via email. Contact: deborah.mills@orc.govt.nz

Wood moisture testing

We have a wood moisture meter service available at the ORC Alexandra office, William Fraser Building, Dunorling Street, Alexandra, Ph (03) 448 8063.

What you can do

- Insulate your home as well as you can; start with the ceiling and then the floor.
- Seal draughty doors and windows.
- Move to cleaner forms of heating - gas fires, pellet burners, heat pumps, low-emission log burners.
- Have appropriate sized heating appliances for the size of your house.

If you are using a log burner, you can take these steps to reduce the amount of PM₁₀ your burner emits:

- Burn dry wood. Green or wet wood produces a lot of smoke and doesn't heat your house as efficiently as dry wood.
- Establish and maintain a hot fire. Once established, keep the fire burning brightly by leaving the air controls open.
- Have your burner and chimney cleaned. This will help reduce pollution and reduce your risk of a chimney fire.
- Be aware. Once lit, check your chimney from the outside to see what effect you're having.

Clean Heat Clean Air

Air pollution levels in the Air Zone 1 towns of Alexandra, Clyde, Cromwell, and Arrowtown often exceed the national standards. Milton has now been added to this list as it showed air pollution levels similar to the Air Zone 1 towns this winter.

The ORC and EnergySmart are working with homeowners in these towns to encourage the installation of clean heating appliances and insulation.

The Clean Heat Clean Air programme offers eligible homeowners a range of financial packages to assist with both an insulation retrofit and installation of a selection of approved clean heat appliances.

To find out if you are eligible and more about the programme, call:

EnergySmart	0800 777 674
ORC	0800 474 082

Programme funded by:

EECA, Aurora, ORC, Central Lakes Trust Dunedin City Council, Central Otago District Council, Clutha District Council, Rural Otago PHO and Community Trust of Otago.



Contact

For more information on air quality monitoring, visit the ORC Air Info web page at: www.orc.govt.nz/airinfo

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