

Annual average concentrations of sulphur dioxide

HIGHLIGHTS:

- Sulphur dioxide increases the risk of respiratory illnesses.
- Only one site breached the national short-term (1 hour) standard ($350 \mu\text{g}/\text{m}^3$) in 2013.
- Daily sulphur dioxide guidelines ($20 \mu\text{g}/\text{m}^3$) were exceeded at three sites.
- Industrial and port sites have higher sulphur dioxide concentrations than urban sites.



What is sulphur dioxide?

Sulphur dioxide (SO_2) is a colorless gas that has a pungent smell. Sulphur dioxide reacts easily with other substances (e.g. water) to form harmful compounds like sulphuric acids (Ministry for the Environment, 2004). It is produced from the combustion of fossil fuels such as coal and oil and other industrial processes, for example, fertiliser manufacturing (Ministry for the Environment, 2004). Nationally, the main human-made source of sulphur oxides emissions is industry.

Sulphur dioxide increases the risk of respiratory illnesses

Sulphur dioxide is associated with respiratory illnesses such as bronchitis. Those most at risk of developing health problems are children, asthmatics, and those with chronic lung disease (Ministry for the Environment, 2004).

Guideline values for SO_2 have been developed to provide some level of protection against long-term health risks, particularly to those that are most vulnerable. The national environment standard for sulphur dioxide concentrations is $350 \mu\text{g}/\text{m}^3$ as a one-hour average. The 24-hour concentrations are based on the World Health Organisation (WHO) short-term guideline ($20 \mu\text{g}/\text{m}^3$) (Ministry for the Environment and Statistics New Zealand, 2014). Exceedances occur when concentrations are greater than these air quality guideline levels.

One of eight sites breached the national short-term standard in 2013

One (Woolston, Christchurch) of the eight monitoring sites exceeded the national short-term (1-hour) standard in New Zealand in 2013. The busy industrial site Woolston breached the $350 \mu\text{g}/\text{m}^3$ one-hour period standard four times and the $570 \mu\text{g}/\text{m}^3$ one-hour standard once.

Daily sulphur dioxide guidelines were exceeded at three sites

In 2013, three of the eight monitoring sites for sulphur dioxide exceeded the WHO daily guideline (20 µg/m³).

- Woolston in Christchurch (65 days)
- Auckland Waterfront (9 days)
- Washdyke in Timaru (1 day)

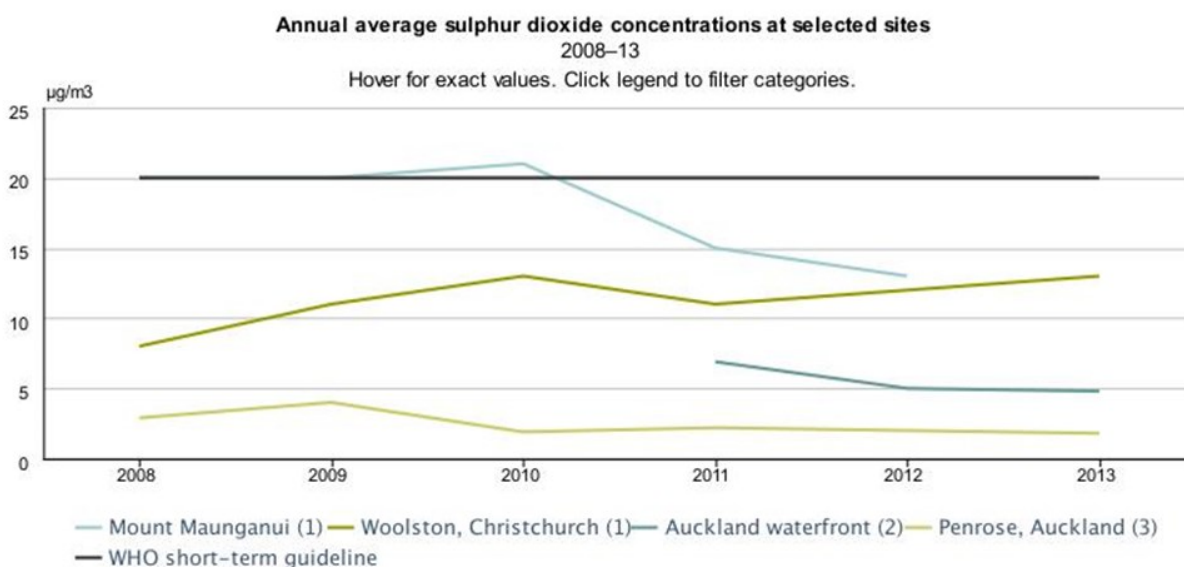
These sites are influenced by industrial or shipping emissions. In 2012, the Totara, Woolston, and Auckland waterfront sites breached the WHO guidelines on 69, 54 and 13 days respectively. The five sites that met the guidelines were a mix of industrial and urban sites. These included:

- Penrose
- Totara St, Mount Maunganui
- St Albans
- Anzac Park, Timaru
- Marsden Point

Selected industrial and port sites have higher sulphur dioxide concentrations than urban sites

Since 2008, annual average sulphur dioxide concentrations at selected industrial (Mount Maunganui and Woolston) and port (Auckland waterfront) sites, were higher compared to concentrations at the Penrose and Auckland urban sites (Figure 1).

Figure 1: Annual average sulphur dioxide concentrations at selected sites, 2008-2013



Source: Regional councils; Auckland Council

Source: Ministry for the Environment and Statistics New Zealand, 2015

Note: Some of the monitoring occurs at locations expected to have the highest concentrations in that area and may therefore not be representative of the whole area it is located in.

REFERENCES:

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