

Days of extreme temperature

This factsheet presents indicators of extreme temperature (hot days and cold days). It comments on the current overlap in where temperature extremes occur and the geographical distribution of populations that are more vulnerable to heat.



Following the end of the Climate Normal Period (1981–2010), nearly every year has had more than the average number of hot days and fewer than average cold days.



New Zealand experienced an average of 33.1 hot days, where maximum temperatures exceeded 25°C and 16.1 cold days, where minimum temperatures were below 0°C in 2022.



In 2022, hot days were most common in Territorial Authorities (TAs) in the north and east of the North Island.



In 2022, cold days were most common in the southern and central South Island and also the central North Island.



Higher concentrations of vulnerable populations live in areas prone to hot days, particularly Māori, young children and people living in higher levels of deprivation.

New Zealand's climate is expected to warm

It is very likely that climate change, will increase the number of hot days (where the maximum temperature exceeds 25°C), particularly in the north of the North Island. Additionally, there will be a decrease in the number of cold days (where minimum temperatures fall below 0°C), particularly in the South Island (Ministry for the Environment 2018; Royal Society Te Apārangi 2017).

Since 1910 +1.3°C (±0.27)	As of 2021, the annual average temperature in New Zealand had risen by 1.3°C since 1910 (Ministry for the Environment 2021).
By 2040: +0.7–1.0°C	Climate scientists predict that relative to 1986–2005, New Zealand will continue to warm by 0.7–1.0°C by the year 2040 (Ministry for the Environment 2018).
By 2090: +0.7–3.0°C	Climate scientists predict that relative to 1986–2005, New Zealand will continue to warm by 0.7–3.0°C by the year 2090 (Ministry for the Environment 2018).

A warmer climate will have several effects on health

A warmer climate alters biological processes in our environment that can affect our health. Increased temperatures can affect health in several ways.

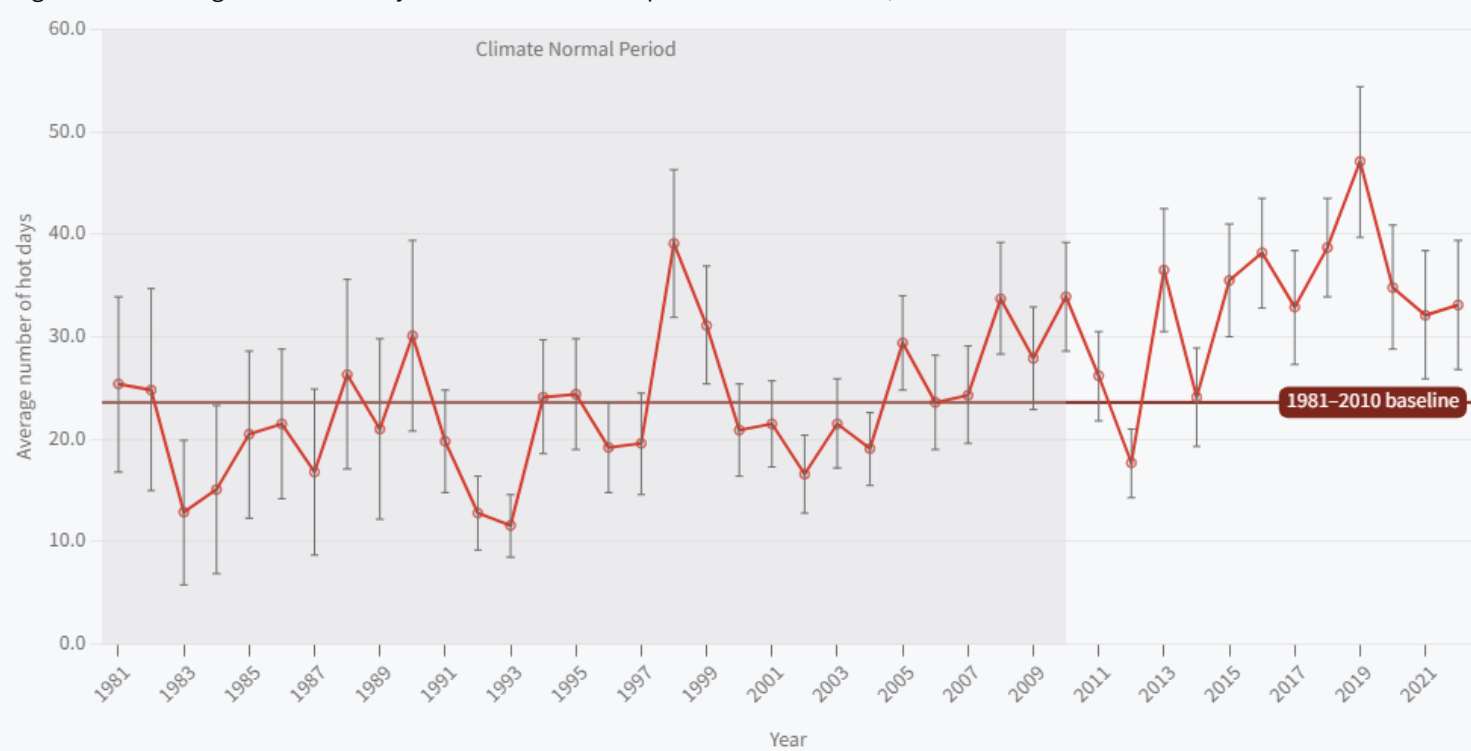
- Research suggests that periods of higher temperatures are linked to an increase in salmonellosis and other gastrointestinal diseases (Lal et al. 2016).
- Increasing temperatures can change the geographical distribution of some mosquitoes, which may carry infectious diseases (Smith et al. 2014).
- Increasing temperatures bring a longer pollen season and increased fire risk, associated with increases in respiratory problems.
- Heat is linked to worsening of heart problems and to an increase in overall death rates (Hales et al. 2007; McMichael et al. 2003).

Our '[Health effects of climate change](#)' domain covers these in more detail.

Since 1981, hot days have become more common and cold days less so

During the Climate Normal Period (1981–2010), which sets a baseline for climate variables like temperature and rainfall, the average number of hot days was 23.6. In 2022, the average was 33.1, an increase of 42% (Figure 1). In the 12 years following the end of the Climate Normal Period, nine had more hot days than the average for the preceding 30 years.

Figure 1 Average number of days with maximum temperatures above 25°C, 1981–2022

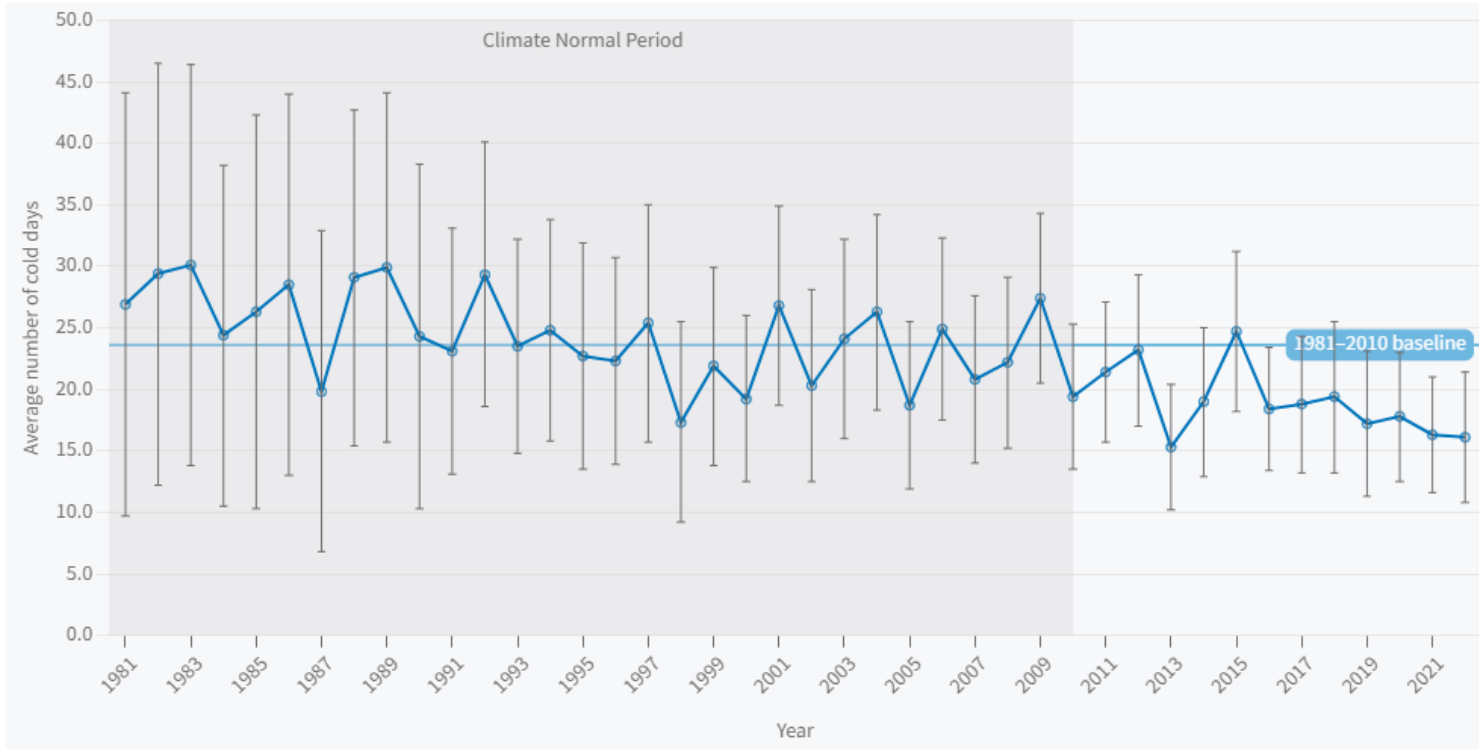


Note: 95% confidence intervals have been presented as error bars. The baseline refers to the most recent Climate Normal Period, 1981–2010 (WMO 2017). Thirty years of data were averaged to act as a benchmark against which current or recent observations can be compared. The New Zealand average is calculated based on the data taken from each climate station with valid data for a given year.

Source: National Climate Database (CliFlo), NIWA

During the Climate Normal Period (1981–2010), the average number of cold days was 23.6. In 2022, there were 16.1 cold days on average, roughly one-third fewer than the 1981–2010 baseline. Six out of 12 post-normal period years had fewer than the baseline number of cold days (Figure 2).

Figure 2 Average number of days with minimum temperatures below 0°C, 1981–2022



Note: 95% confidence intervals have been presented as error bars. The baseline refers to the most recent Climate Normal Period, 1981–2010 (WMO 2017). Thirty years of data were averaged to act as a benchmark against which current or recent observations can be compared. The New Zealand average is calculated based on the data taken from each climate station with valid data for a given year.

Source: National Climate Database (ClimFlo), NIWA

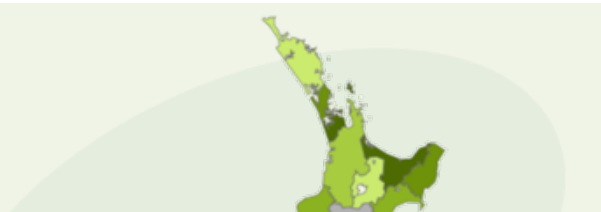
Regional variation in climate

Combining temperature and population data shows that Northland, the east coast of the North Island, and parts of the Bay of Plenty are likely to be regions where people will be particularly affected by the direct health effects of temperature increases.

For more information about the distribution of hot and cold days, as well as vulnerable population groups around New Zealand, continue on to the Territorial Authority (TA) factsheet.

 **[Continue to read this factsheet at the Territorial Authority \(TA\) level](#)**

 **[Interactive regional dashboard](#)**



Data for this indicator

This indicator analyses climate station records of the daily maximum and minimum temperatures around New Zealand, sourced from the National Climate Database (ClimFlo), a web service provided by the National Institute of Water and Atmospheric Research (NIWA). One climate station was selected per Territorial Authority, based on their proximity to each TA's population-weighted centroid (2018 Census data).

The number of hot days (days with a maximum air temperature above 25°C) and the number of cold days (days with a minimum temperature below 0°) was counted for each year by TA. Only years with data for 90% of all days or more were counted. Data was compared to the most recent Climate Normal Period, 1981–2010, where the 30-year average acts as a benchmark against which more recent observations can be compared.

All 95% confidence intervals have been presented as error bars on graphs.

For additional information, see the metadata link below.

References

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Previous factsheets:

[2021](#)

[2019](#)

[2014](#)

Other related topics include:

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[Vulnerability to climate change](#)

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Further information

For descriptive information about the data **i** [Metadata Sheet](#)

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