Greater Wellington
Te Pane Matua Taiao

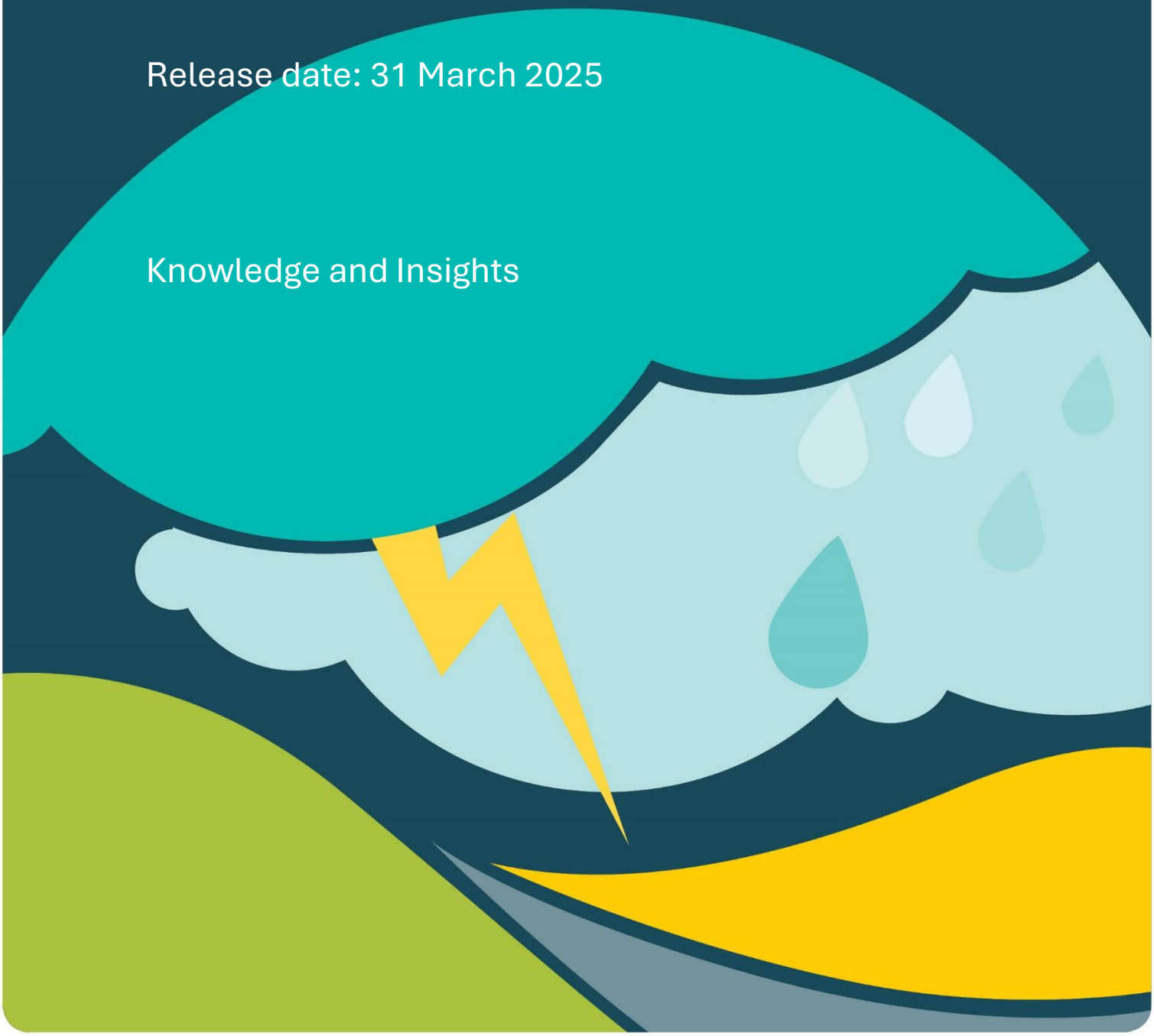
Climate drivers and seasonal outlook for the Wellington Region

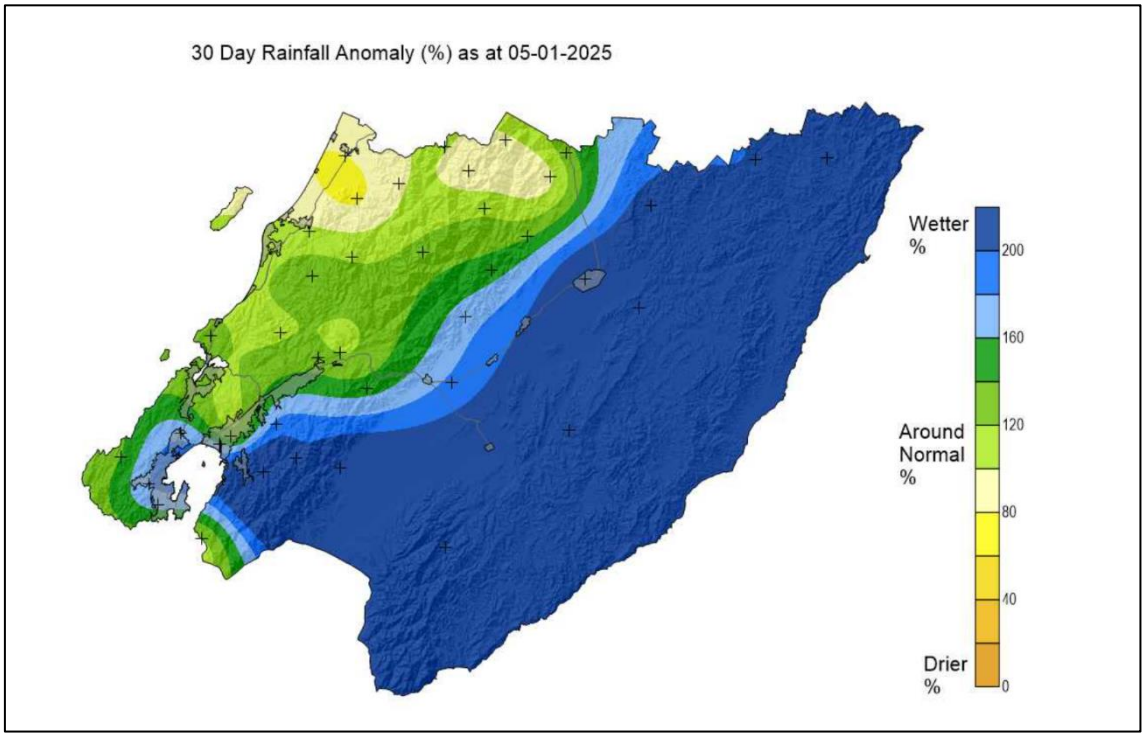
Summer 2024-25 summary

Autumn 2025 outlook

Release date: 31 March 2025

Knowledge and Insights





On 5th January, our 30-day rainfall monitoring showed much wetter (blue area) conditions than normal all over the Wairarapa. This was a very unusual La Niña summer, with extremely cold and wet conditions persisting early in the new year taking many by surprise. It was the coldest January on record in Martinborough, and the third coldest at the Wellington Airport meteorological station (data since 1962). On the same day the rainfall map above was taken, Martinborough had a maximum daytime temperature of only 14 degrees (equal second lowest on record for January), and people were using their wood burners as if in the middle of winter. This abrupt change to wintery conditions was a huge contrast to the hot temperatures in the Wairarapa prior to Christmas. In fact, December 2024 was the third hottest on record for Masterton. Source: Mapped data using the GWRC rainfall network.

Overview

Summer 2024-2025

Summer 2025 has entered the history books as one of the most unusual in the recent past. We had a weak La Niña active in the climate system, but this ENSO event was like no other. Initially, December was characterized by very dry conditions in the Wairarapa, with plenty of warm days promising a hot summer ahead. Masterton indeed ended up having the 3rd hottest December on record. But everything started changing as easterly rainfall events developed earlier than predicted, as Christmas approached. Bitterly cold temperatures followed into the new year, with conditions more typical of the middle of winter. Such cold summer weather is extremely unusual for a La Niña. After the big flip, Martinborough had the coldest January on record, while Wellington ranked as the third coldest January (measured at the airport station). It was bitterly cold on the eastern coast for most of the month, with Castlepoint measuring the second coldest January on record (data since 1972) and very few if any opportunities for pleasant swimming. To add to the mix, it was much warmer on the Kāpiti Coast, which in fact ended up having the second hottest February on record at Paraparaumu (data since 1953). Overall, it was an extremely dry summer over the Kāpiti (third driest summer on record for Paraparaumu), even though not as severe as what was observed in Taranaki and further north.

Climate drivers

After a very unusual (weak) La Niña, the climate drivers are now gradually moving towards neutral conditions. The oceanic temperature anomalies remain very warm in the Tasman Sea and are also warming east of New Zealand when compared to the long-term average expected for this time of the year. With most climate drivers being neutral, the local oceanic temperatures are expected to play a significant role in helping shape the seasonal climate anomalies of the transition season into winter this year.

Climate outlook for autumn 2025

International climate models seem to agree that most of the climate drivers will remain about neutral for the rest of autumn. In the absence of any major atmospheric and oceanic forcings, the locally warmer than normal water temperatures should play a role in maintaining an elevated risk of heavy rainfall events, as we advance to the cold season. Seasonal anomalies should continue with a slight tendency towards a wet signal on the east coast and a dry signal on the Kāpiti, before transitioning to a colder westerly regime with positive rainfall anomalies west of the ranges likely towards winter. For the most part, we expect temperatures to remain above average (i.e. as originally predicted), now that we seem to have left the persistent southerlies behind.

Contents

1. Climate drivers

1.1 El Niño – Southern Oscillation (ENSO)

The ensemble projections of the Australian climate model below show that the ENSO event is predicted to remain mostly within the neutral range during autumn and winter.

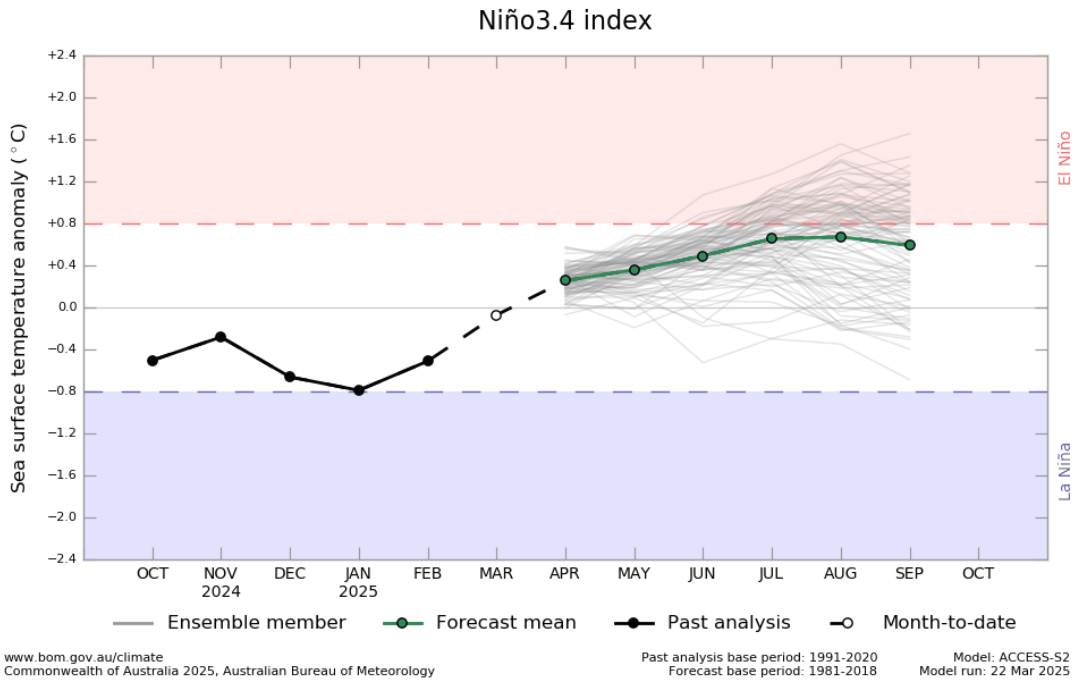


Figure 1.1: Average modelled projections (in green) show that the ENSO phenomenon is expected to remain within the neutral range at least until spring. Source: Australian Bureau of Meteorology.

1.2 Sea Surface Temperature (SST) anomalies

The SST anomalies and the total Sea Ice Extent (SIE, in white) are shown in Figure 1.2, as of 23 March 2025.

The overall pattern shows a weak La Niña signature transitioning back to a neutral ENSO, with a weak equatorial cold tongue now extending well into North America. Meanwhile, marine heatwave conditions continue to prevail around New Zealand, especially within the Tasman Sea. Antarctic sea ice has reached its minimum within the current annual cycle, sitting at a negative anomaly very similar to what was observed back in 2024.

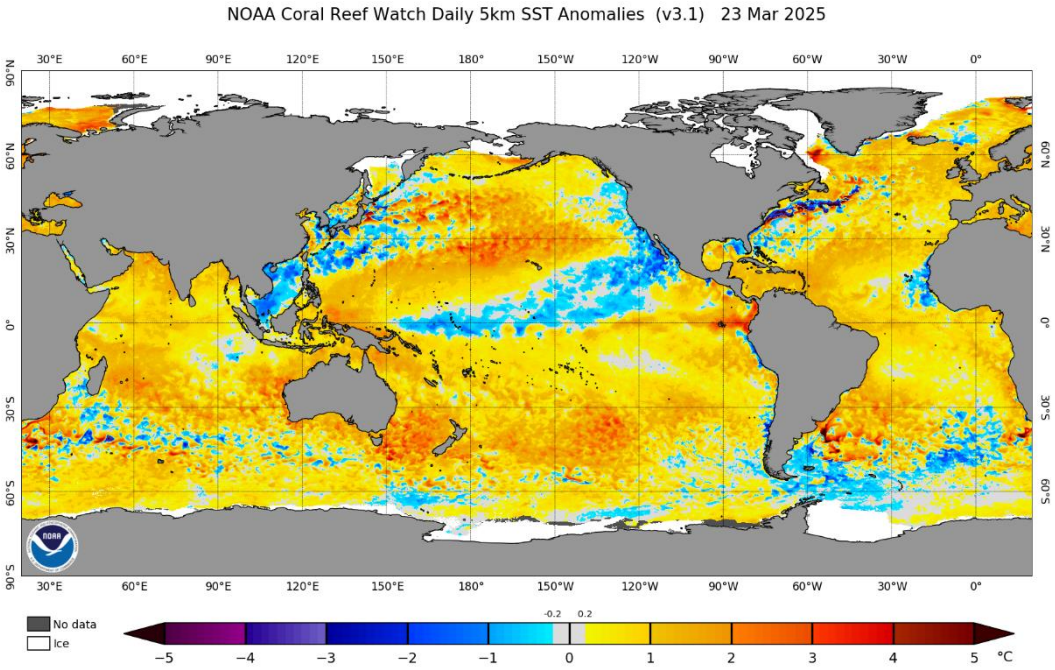


Figure 1.2: Sea Surface Temperature (SST) anomalies as of 23 March 2025. Sea ice coverage is shown in white. The Equatorial Pacific (ENSO) shows a return to neutral ENSO conditions, but marine heatwaves persist around New Zealand. Sea Ice Extent (in white) reached very low levels, similarly to last year. Source: NOAA.

1.3 Southern Annular Mode (SAM)

The SAM is the natural pressure oscillation between mid-latitudes and the Antarctic region. Normally, positive SAM is associated with high pressures around the North Island keeping the weather stable and dry/cloud-free (especially in summer), whereas the opposite is expected when the SAM is negative.

The SAM has been oscillating around a neutral range for most part, without a clear preferred pattern. Figure 1.3 shows that the summer average sea level pressure anomaly was characterised by a blocking system east of New Zealand. This system was responsible for the persistent southerlies and very unusual La Niña summer, compared to past La Niñas.

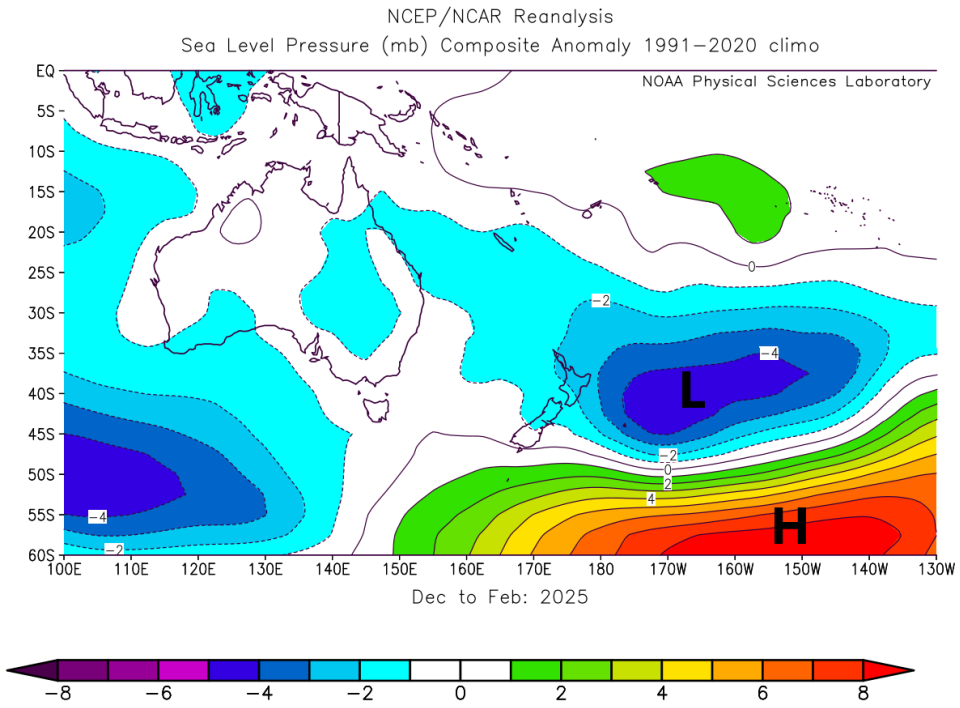


Figure 1.3: Mean sea level pressure anomaly map (hPa) for summer 2024-2025. The 'L' and 'H' indicate the centre of the anomalous low and high pressure forming a blocking pattern east of New Zealand. This system was responsible for creating a very unusual La Niña circulation, with strong southerly flow and very cold temperatures early in the new year. This pattern was not predicted by the climate models. Source: NCEP Reanalysis.

2. Seasonal variability and outlook

2.1 Trend analysis

The graphs below (Figure 2.1) show summaries of seasonal climate change and variability for Wellington and the Wairarapa using reference climate stations, chosen based on length of data record and availability.

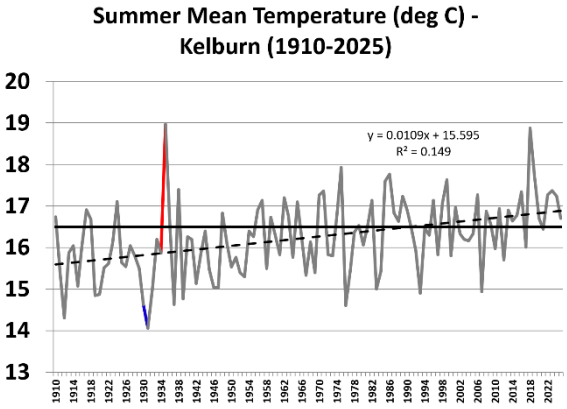
The key climate variables shown are mean temperature, total sunshine hours, mean wind, total rainfall and total number of rain days (above 0.1 mm). Temperature measurements go back to the 1910s, allowing for a meaningful analysis of climate change trends. Most other variables also have long periods of measurement greater than 50 years, except sunshine hours and wind for the Wairarapa; these are only available for less than two decades, which is a very short period climatologically and does not allow for an analysis of trends yet.

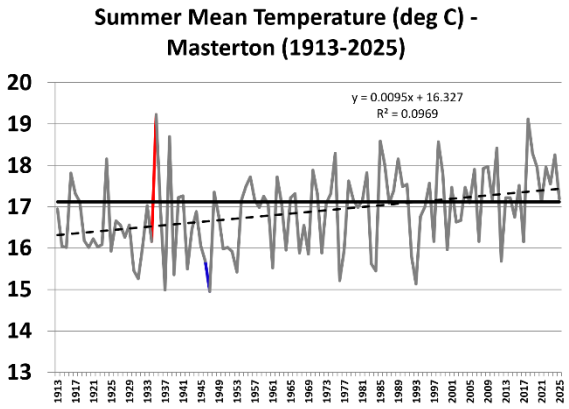
The red and blue bars show the extreme years of the entire measurement period. Red indicates seasons that were warmer, drier, sunnier and less windy than average (i.e., extreme hot/dry), and blue indicates seasons that were colder, wetter, cloudier and windier than average (i.e., extreme cold/wet). The reference climatological average (1981-2010) is shown by a horizontal bar where available.

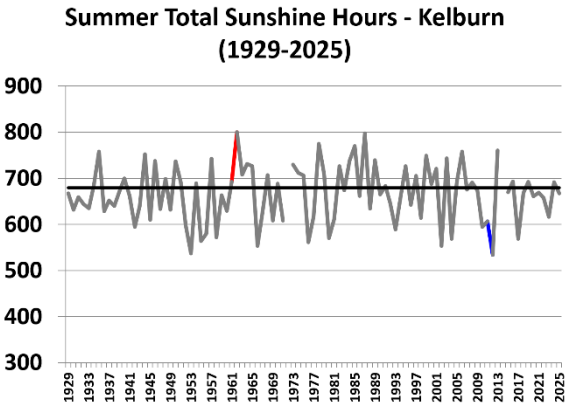
An analysis of linear trends associated with climate change is plotted onto the graph only when the trends are statistically different from zero at the 99% confidence level.

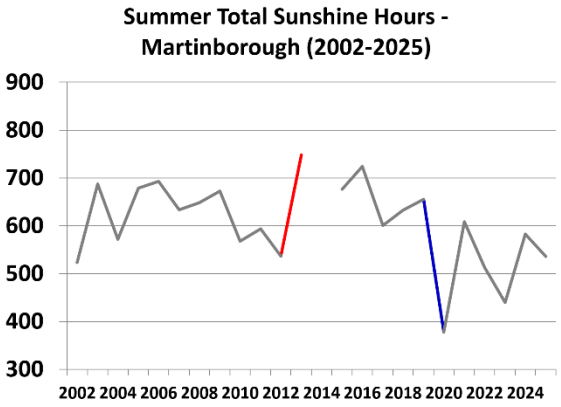
The climate change and variability summary for summer 2025 is as follows:

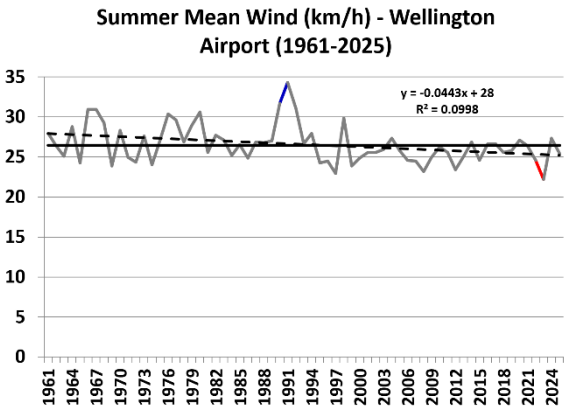
- Statistically significant trends are seen only for temperature and wind, meaning that summer is getting warmer and less windy due to ongoing climate change. The long-term historical warming trend is about one degree per century for both Wellington Masterton;
- Summer 2025 mean temperatures were close to the long-term average for both Wellington and Wairarapa;
- Sunshine hours were near average for Wellington and more on the lower end for Wairarapa (where records are still too short for a 30-year climatology);
- Seasonal average wind speed was below average for Wellington and about average for Wairarapa;
- Total seasonal rainfall was slightly below average for Wellington and above average for the Wairarapa;
- Total seasonal rain days were near average for Wellington and above average for the Wairarapa.

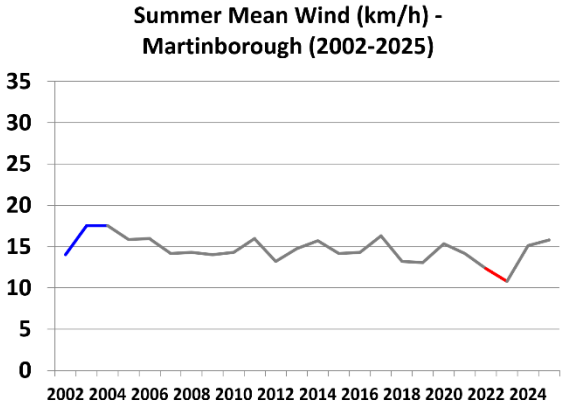

Summer Mean Temperature (deg C) - Kelburn (1910-2025)
y = 0.0109x + 15.595
R² = 0.149


Summer Mean Temperature (deg C) - Masterton (1913-2025)
y = 0.0095x + 16.327
R² = 0.0969


Summer Total Sunshine Hours - Kelburn (1929-2025)


Summer Total Sunshine Hours - Martinborough (2002-2025)


Summer Mean Wind (km/h) - Wellington Airport (1961-2025)
y = -0.0443x + 28
R² = 0.0998


Summer Mean Wind (km/h) - Martinborough (2002-2025)

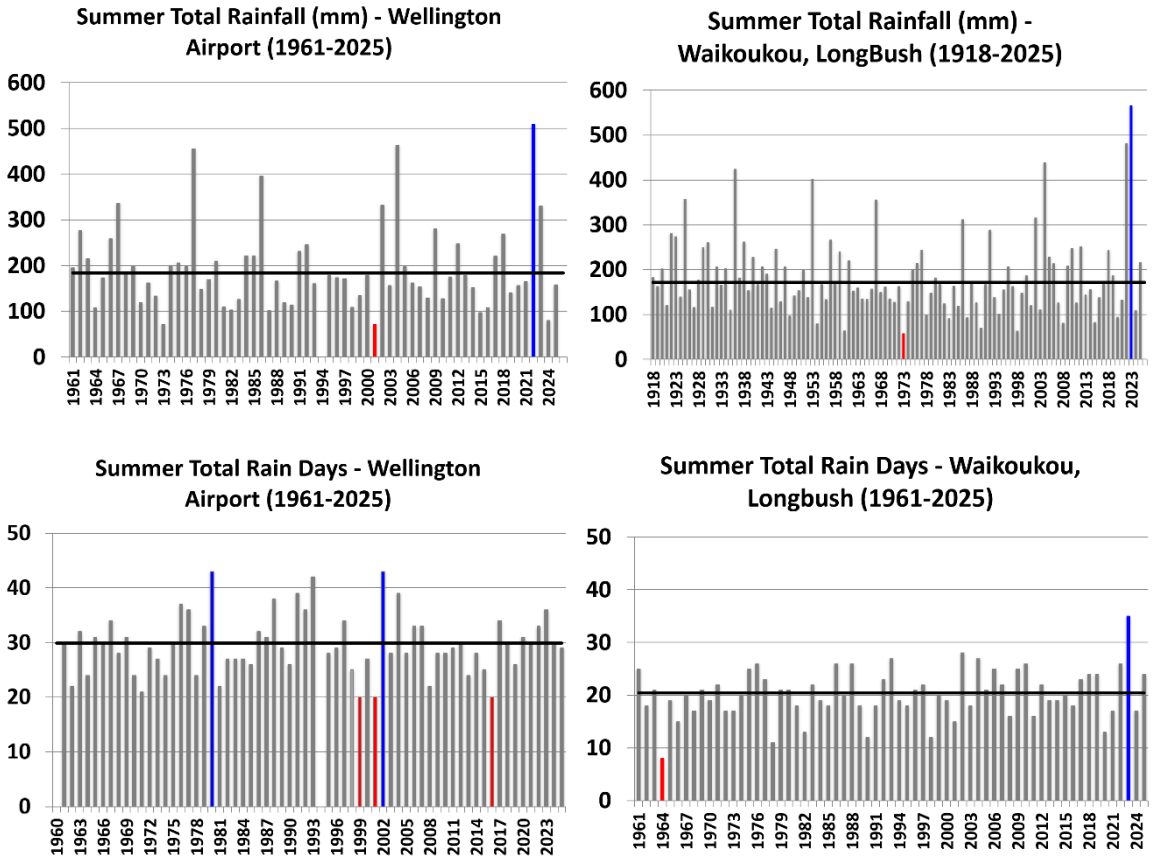


Figure 2.1: Climate change and variability graphs for summer in Wellington and the Wairarapa. The thick horizontal line shows the 1981-2010 average (where available), and the dashed line shows the linear trend. Trends are plotted only when statistically significant at 99% confidence level. For all graphs, the bright red and blue bars show the extreme min and max values for each time series (red for warm, dry, sunny and calm and blue for cool, wet, cloudy and windy). The key variables shown are mean temperature, total number of sunshine hours, mean wind speed, total rainfall and total number of rain days (>0.1mm for Wellington and > 1mm for Waikoukou). Missing bars means that no reliable mean seasonal data was available for that particular year.

2.2 Seasonal Outlook

- Weak residual La Niña signature likely still driving some easterly rainfall events, returning to a more westerly regime towards the beginning of winter
- Warmer than long-term average, with risk of tropical influences still high until the end of April
- Higher likelihood of thunderstorms and heavy rainfall events as the colder season starts to kick in, with westerly flow clashing with local marine heatwaves and enhanced evaporation
- Seasonal rainfall: initially wet signal in the east Wairarapa and dry in the Kāpiti but likely reversing towards early winter.

Whaitua*	Variables	Climate outlook for autumn 2025*
Wellington Harbour & Hutt Valley	**Temperature:**	Warmer than average.
	Rainfall:	Average or below initially, with irregular distribution. High chance of extreme rainfall events late in the season
Te Awarua-o-Porirua	**Temperature:**	Warmer than average.
	Rainfall:	Average or below initially, with irregular distribution. High chance of extreme rainfall events late in the season
Kāpiti Coast	**Temperature:**	Warmer than average.
	Rainfall:	Average or below, with irregular distribution. High chance of extreme rainfall events late in the season
Ruamāhanga	**Temperature:**	Warmer than average.
	Rainfall:	About average, with irregular distribution. High chance of extreme rainfall events late in the season
Wairarapa Coast	**Temperature:**	Warmer than average.
	Rainfall:	Average or above initially, with irregular distribution. High chance of extreme rainfall events late in the season

*Whaitua are the whole catchment areas (https://www.gw.govt.nz/environment/freshwater/protecting-the-waters-of-your-area/).

Refer also to the drought monitor for our catchments: https://www.gw.govt.nz/environment/environmental-data-hub/climate-monitoring/drought-check/

Appendix 1 – Seasonal temperature and wind anomalies for selected stations

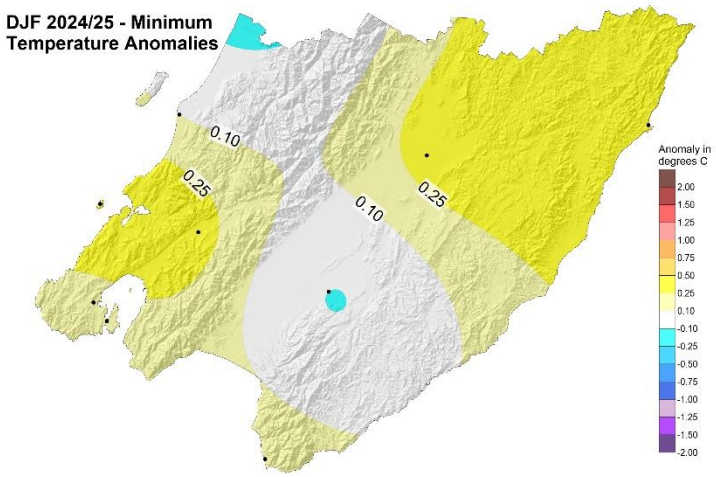
Table 1: Temperature anomalies (°C) for summer (DJF) 2024-2025 relative to the 1991-2020 climatology. Significant positive and negative anomalies (greater than 0.5°C magnitude) are highlighted in red (warmer than average) or blue (colder than average).

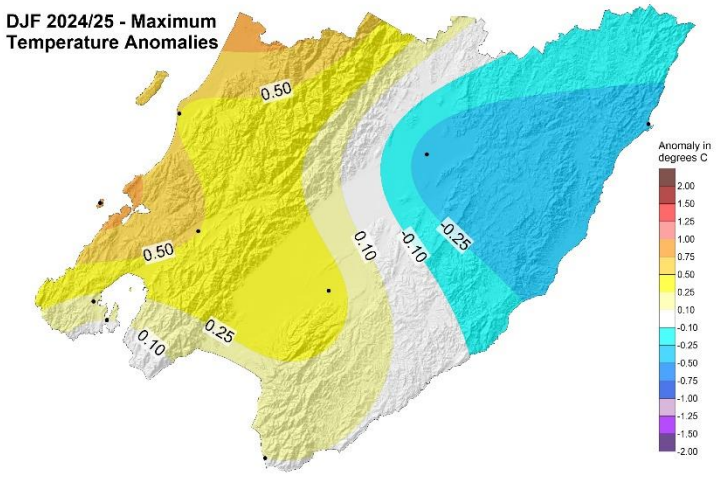
Dec-Jan-Feb 2025	Min T	Max T
Castlepoint	**0.4**	**-0.3**
Kelburn	**0.2**	**0.2**
Masterton	**0.3**	**-0.3**
Ngawi	**0.2**	**0.1**
Paraparaumu	**0.1**	**0.5**
Wellington Airport	**0.1**	**0.1**
Martinborough	**-0.1**	**0.3**
Mana Island	**0.4**	**0.9**

Table 2: Wind anomalies (%) for summer (DJF) 2024-2025 relative to the 1981-2010 climatology. Significant positive and negative anomalies (greater than 5%) are highlighted in red (calmer than average) and blue (windier than average).

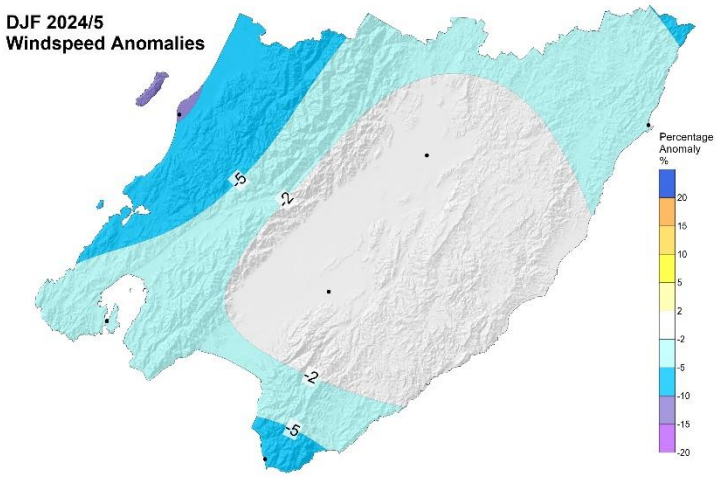
Dec-Jan-Feb 2025	Wind %
Castlepoint	**-4.2**
Masterton	**0.6**
Ngawi	**-6.6**
Paraparaumu	**-10.2**
Wellington Airport	**-3.3**
Martinborough	**1.5**

Appendix 2 – Seasonal anomaly maps relative to the long-term average (1991-2020)

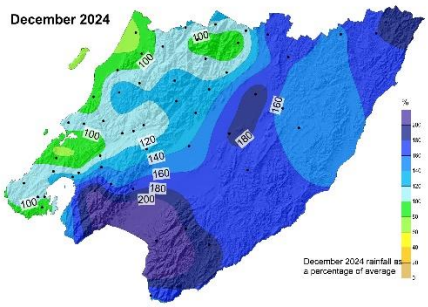


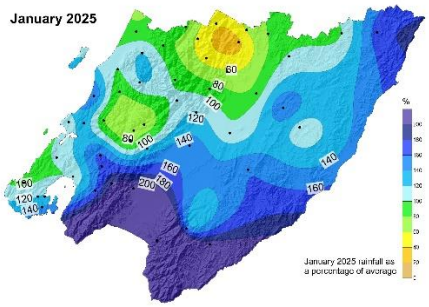


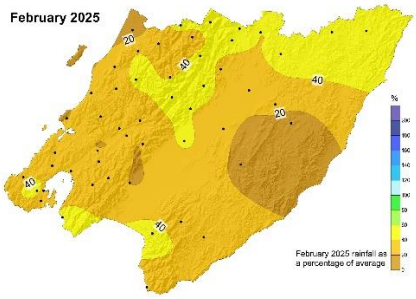
Min and Max Temperature anomalies (°C)

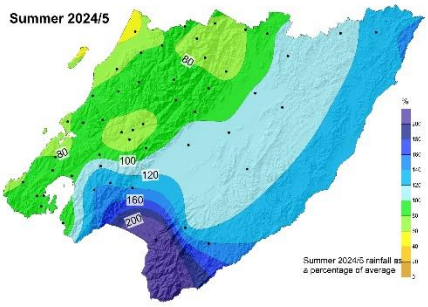


Wind anomalies (%)









Rainfall anomalies (%)

GWRC's climate science tools

- **Seasonal climate hub**
  https://www.gw.govt.nz/environment/environmental-data-hub/climate-monitoring/

- **Daily climate maps**
  https://graphs.gw.govt.nz/envmon/daily-climate-maps?view=rainfall-table

- **Drought Monitor**
  https://www.gw.govt.nz/environment/environmental-data-hub/climate-monitoring/drought-check/

- **Climate change impacts (reports and mapping tools)**
  https://www.gw.govt.nz/environment/climate-change/impacts-on-our-region/