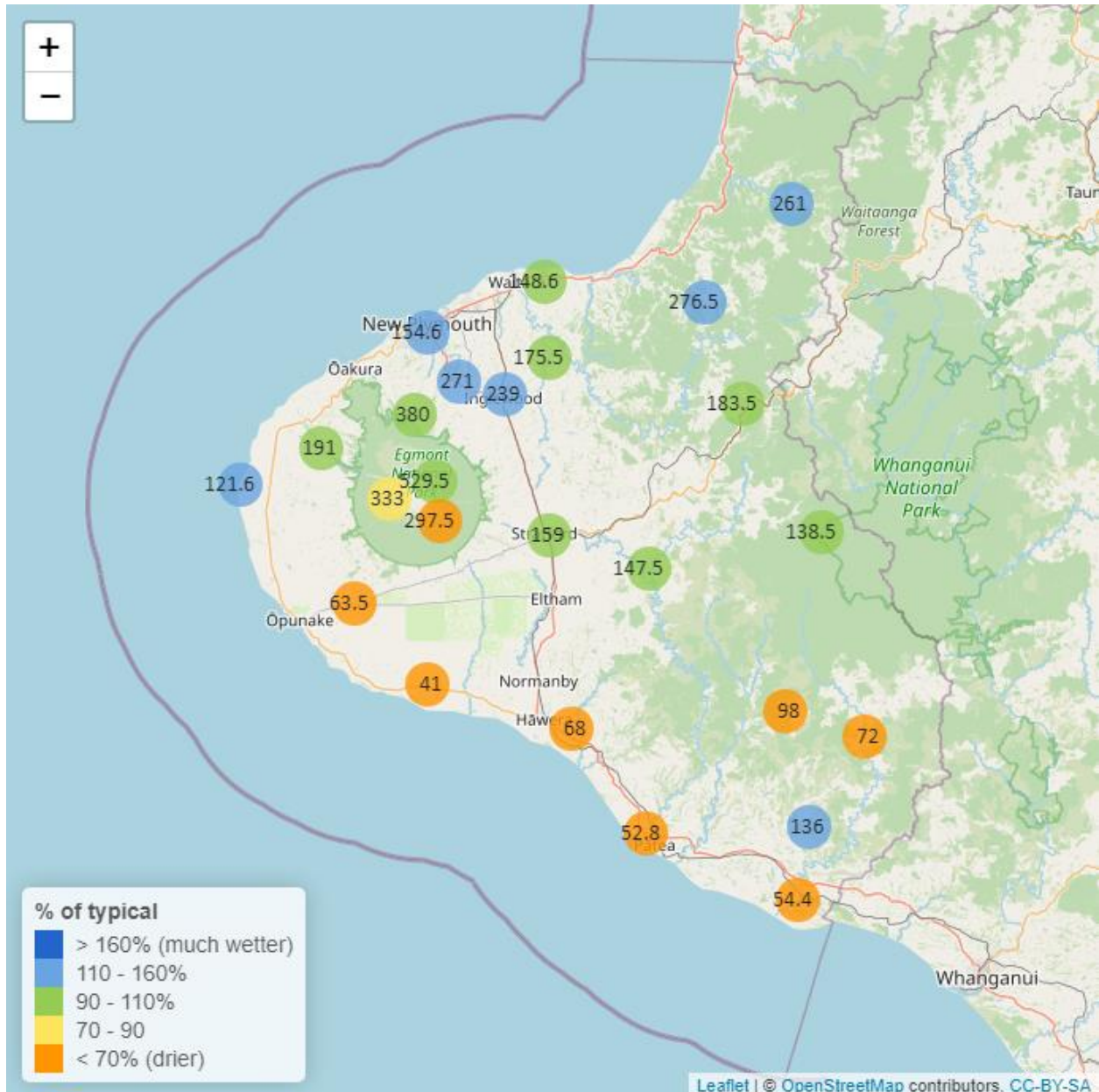


Taranaki Regional Council Monthly Rainfall and Environmental Data Report for December 2023

Note: The data presented here are provisional data only and may change as a result of quality control at a later date.

1. Rainfall

Map 1: December total rainfall (mm) and percentage of long-term mean (colour key).



Map1a. Total rainfall 1 January to end December (mm) and percentage of long-term mean (colour key).

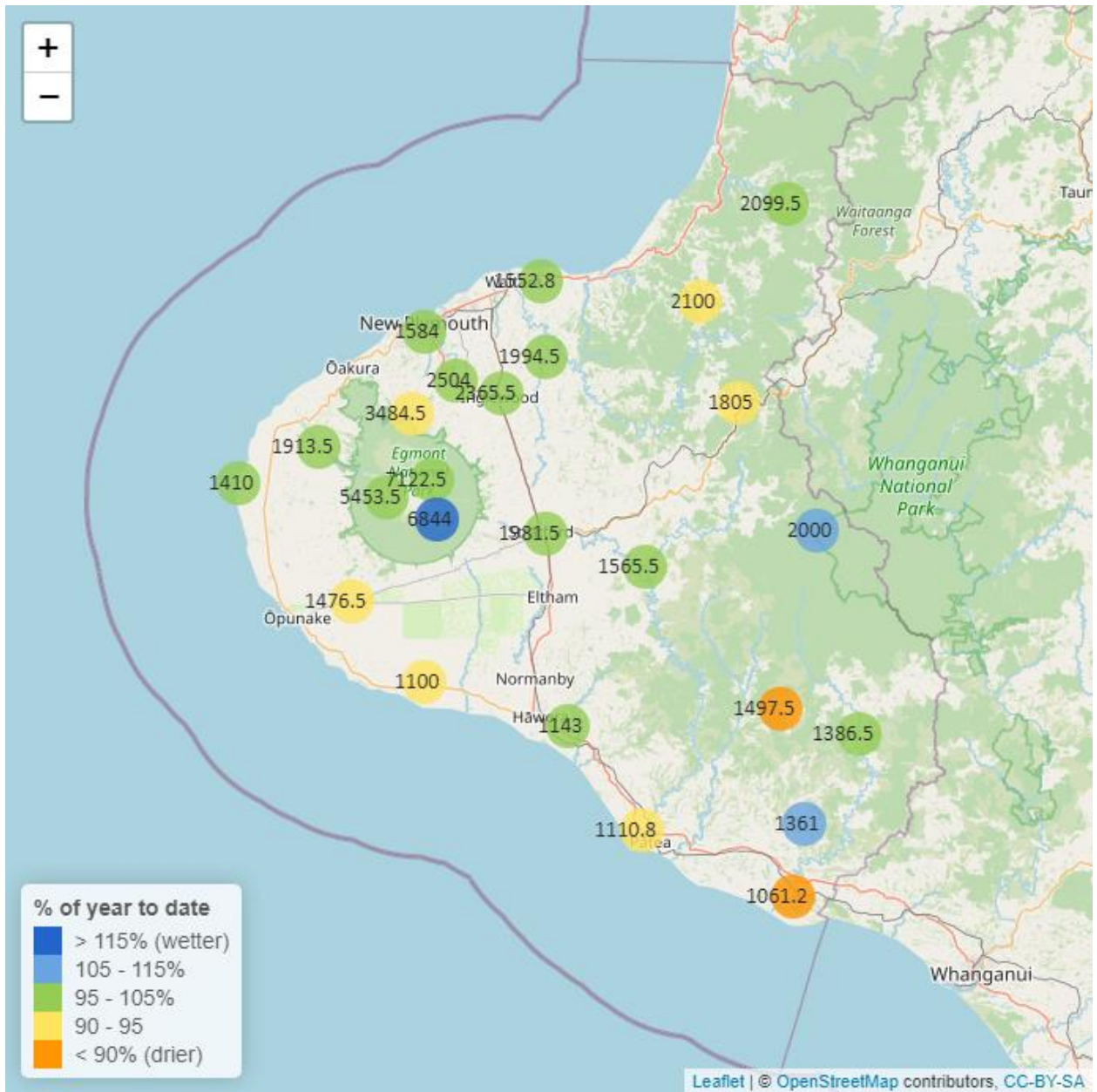


Table 1: Rainfall December and year to date totals for rain gauge sites in Taranaki.

Rain gauge	December			Year to Date			Records Began
	# days with rain	Total rain (mm)	% of typical month	Total to date (mm)	% of typical year to date	% of typical full year	
North Egmont at Visitors Centre	17	529.5	90.0	7122.5	102.6	102.6	1991
Dawson Falls	16	297.5	68.4	6844.0	115.2	115.2	1933
Kapoaiaia at Kahui Hut	18	333.0	81.9	5453.5	104.0	104.0	2006
Mangorei Upper at Forest Hill	16	380.0	98.7	3484.5	91.6	91.6	2018
Waiwhakaiho at Hillsborough	12	215.5	160.8	1846.5	100.8	100.8	2013
Brooklands Zoo at New Plymouth	14	154.6	127.6	1584.0	97.9	97.9	2012
Motunui M39 at Weston W3	15	148.6	103.3	1552.8	98.6	98.6	1999
Waiwhakaiho at Egmont Village	13	271.0	125.5	2504.0	103.3	103.3	1991
Manganui at Everett Park	13	175.5	96.1	1994.5	96.0	96.0	1987
Inglewood at Oxidation Ponds	12	239.0	110.2	2365.5	100.5	100.5	2000
Stony at Mangatete Bridge	17	191.0	103.3	1913.5	95.3	95.3	2004
Kapoaiaia at Lighthouse	16	121.6	112.1	1410.0	101.4	101.4	1930
Taungatara at Eltham Rd	15	63.5	44.6	1476.5	93.1	93.1	2005
Kaupokonui at Glenn Rd	12	41.0	39.7	1100.0	93.9	93.9	1998
Patea at Stratford	12	159.0	99.5	1981.5	99.6	99.6	1999
Mangaehu at Bridge	15	147.5	107.9	1565.5	98.2	98.2	1999
Kotare at OSullivans	15	261.0	132.2	2099.5	97.3	97.3	1998
Uruti at Kaka Rd	17	276.5	125.5	2100.0	93.9	93.9	1991
Pohokura Saddle	16	183.5	101.7	1805.0	90.5	90.5	1991
Omaru at Charlies	15	138.5	91.2	2000.0	110.0	110.0	2006
Omahine at Moana Trig	15	98.0	69.8	1497.5	87.9	87.9	2007

	December			Year to Date			
Rain gauge	# days with rain	Total rain (mm)	% of typical month	Total to date (mm)	% of typical year to date	% of typical full year	Records Began
Waitotara at Rimunui Station	15	72.0	59.3	1386.5	100.6	100.6	1994
Waitotara at Ngutuwera	11	136.0	113.0	1361.0	105.9	105.9	1999
Tawhiti at Duffys	13	68.0	63.4	1143.0	103.2	103.2	1994
Patea at Bore 3	12	52.8	46.3	1110.8	93.7	93.7	2006
Waitotara at Hawken Rd	13	54.4	51.9	1061.2	88.0	88.0	2016

1.2 Long-term data patterns

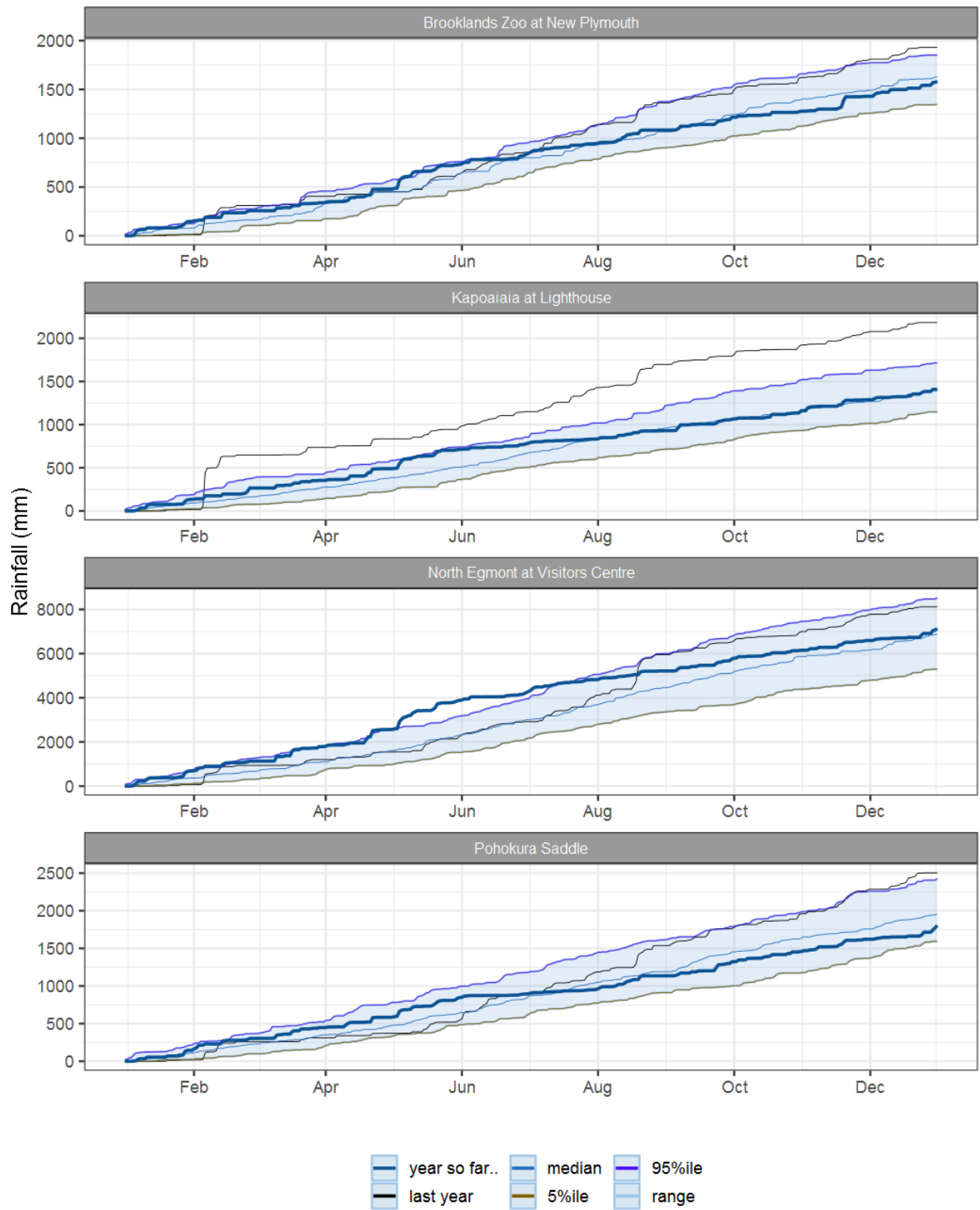


Figure 1.1: This years and last years data set in context of historic record at selected rain gauge sites in Taranaki.

1.3 Monthly Bar Charts

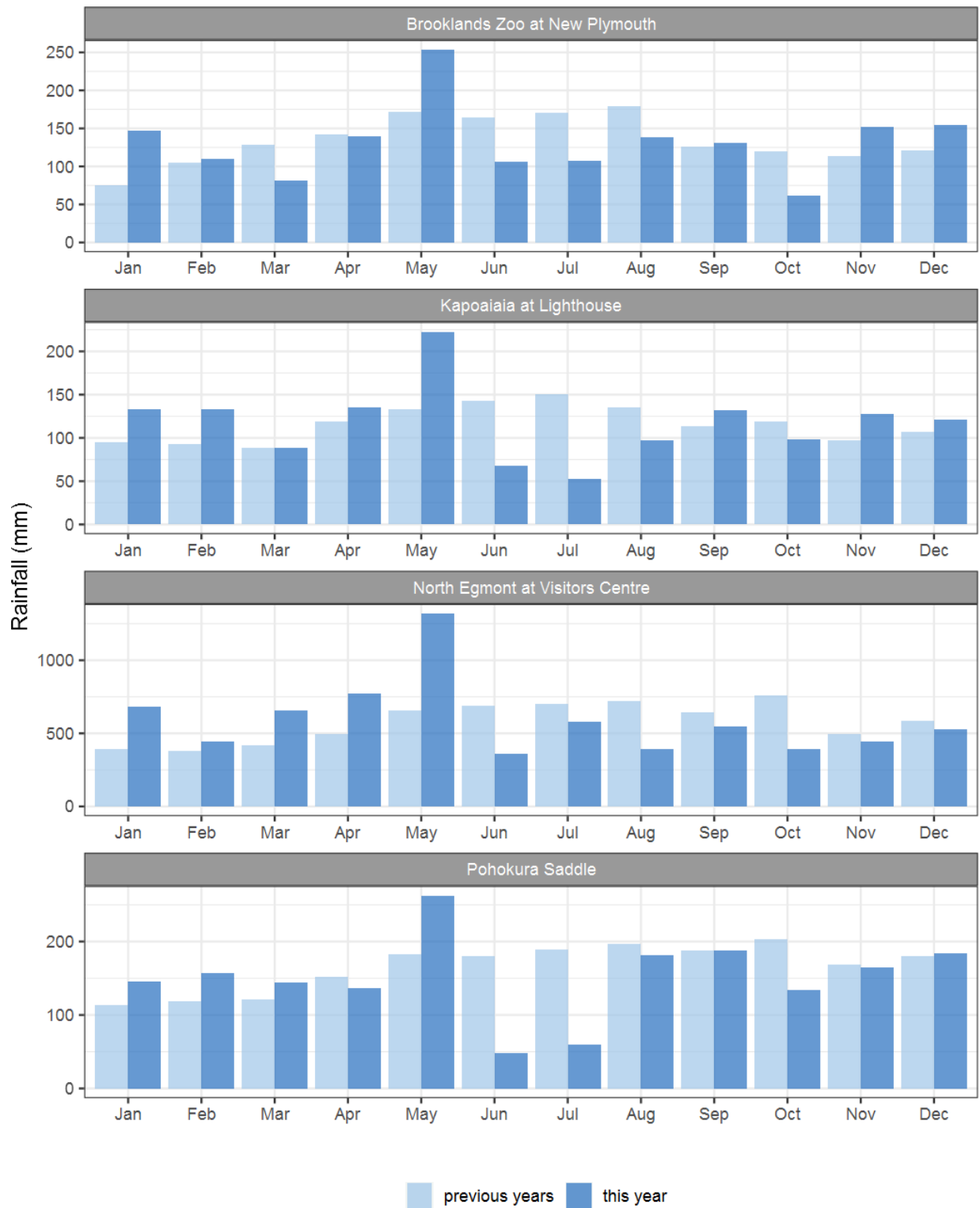


Figure 1.2: Monthly rainfall totals for this month and the mean of all previously recorded months.

2. River Flow

Map 2: December mean river flows (m³/sec), with difference as percentage of long-term mean.

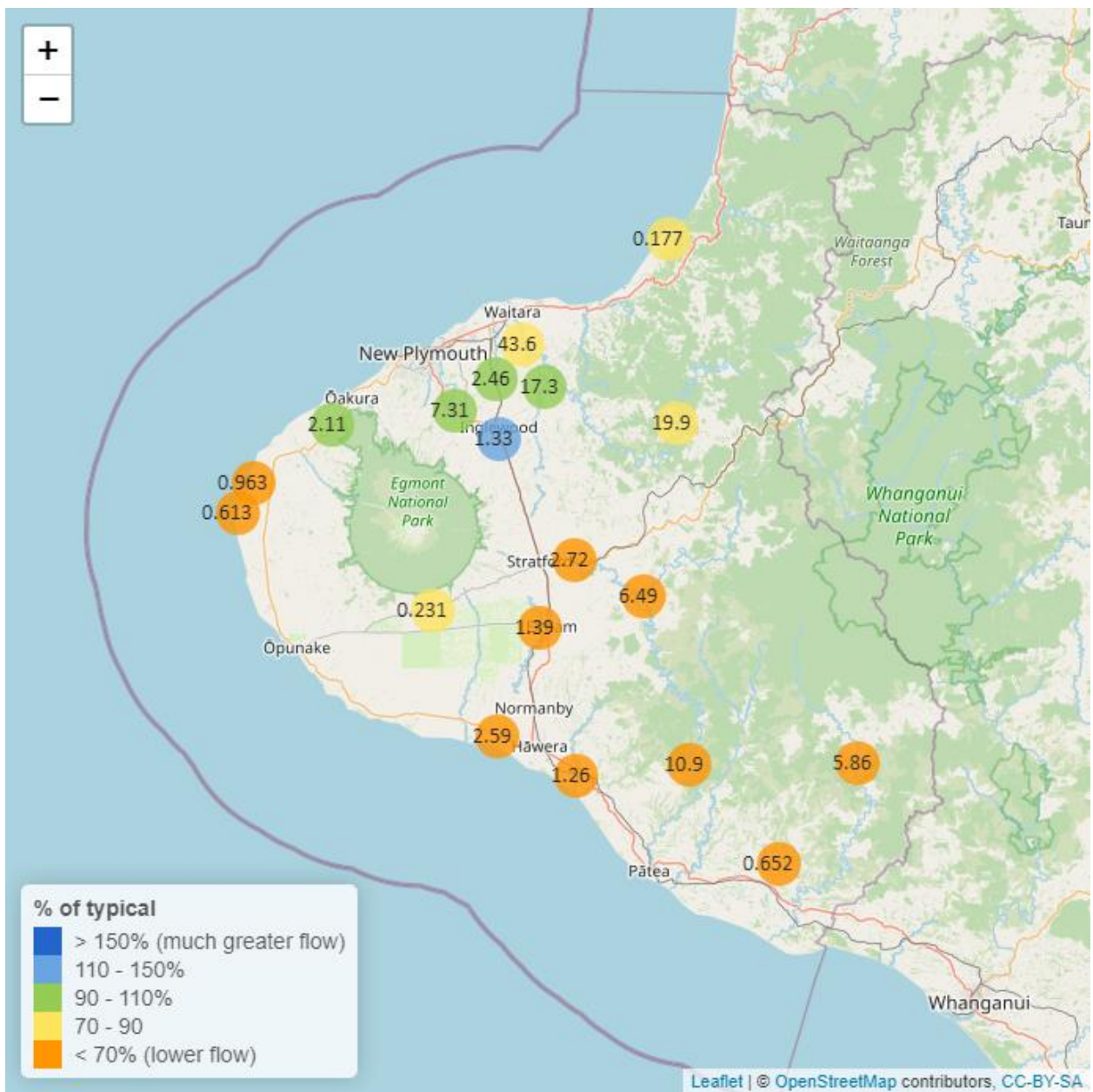


Table 2: Summary of high, low and mean flow for December and for December in all preceding years of record.

December 2023 - Recorded flows (m3/sec)								
River and Site	Highs		Lows		Mean		December maximum	Data years
	current month	historic	current month	historic	current month	historic		
Kapoaiaia at Lighthouse	3.25	3.05	0.20	0.29	0.61	1.06	6.23	37
Mangaehu at Bridge	27.80	38.60	2.32	2.82	6.49	11.30	61.50	45
Manganui at Everett Park	69.50	57.10	5.22	3.79	17.30	17.20	298.00	32
Mangawheroiti Above Intake W.W	0.29	0.61	0.19	0.16	0.23	0.32	0.56	11
Moumahaki at Johnston Rd	0.94	11.40	0.38	0.47	0.65	2.81	11.90	5
Ngatoro at SH3	4.69	3.77	0.46	0.31	1.33	1.15	35.30	35
Patea at McColls Bridge	40.70	67.70	3.00	2.12	10.90	23.00	87.30	36
Patea at Skinner Rd	7.85	11.10	0.93	0.83	2.72	4.01	25.20	45
Tangahoe below Railway Bridge	3.16	22.40	0.73	1.40	1.26	6.39	8.86	6
Timaru at Tataraimaka	7.05	7.26	0.49	0.43	2.11	2.06	66.80	10
Waikaramarama at Bridge	1.08	1.02	0.01	0.01	0.18	0.21	4.42	6
Waingongoro at Eltham Rd	2.70	5.38	0.79	0.52	1.39	2.05	9.64	48
Waingongoro at SH45	3.81	13.40	1.84	1.81	2.59	5.28	7.99	43
Waiongana at SH3a	9.64	8.16	0.65	0.48	2.46	2.56	50.70	42
Waitara at Bertrand Rd	213.00	198.00	10.00	9.54	43.60	52.20	343.00	42
Waitara at Purangi Bridge	125.00	103.00	1.94	0.71	19.90	22.90	249.00	24
Waitotara at Rimunui Station	13.70	36.60	2.91	4.13	5.86	12.10	60.70	18
Waiwhakaiho at Egmont Village	29.60	25.70	2.26	2.18	7.31	7.90	167.00	43
Warea at Coast	3.41	6.96	0.41	0.50	0.96	1.71	5.15	7

2.2 Long-term data patterns

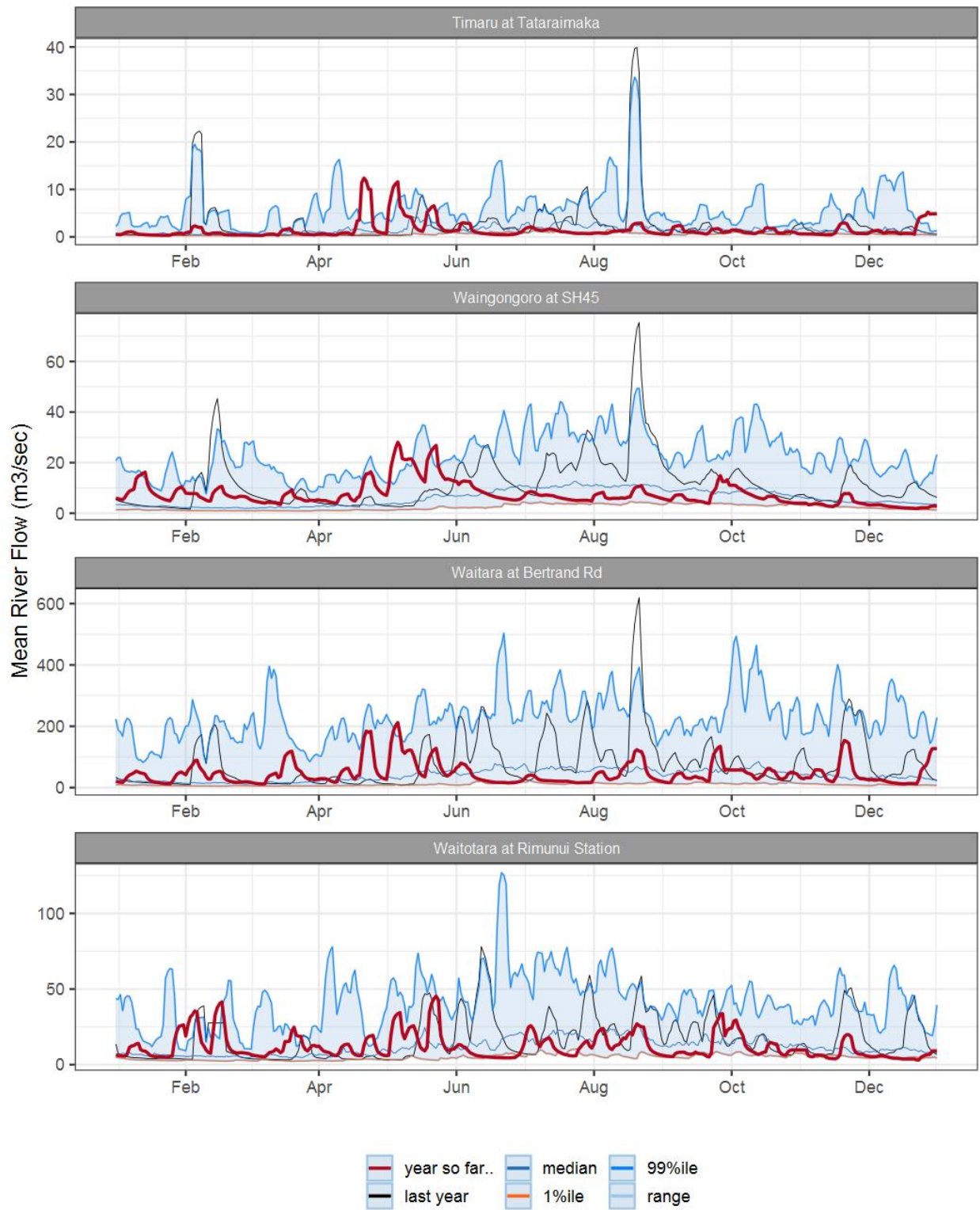


Figure 2.1: Running average river flows for selected sites, set in context of the historic record.

2.3 Monthly Bar Charts

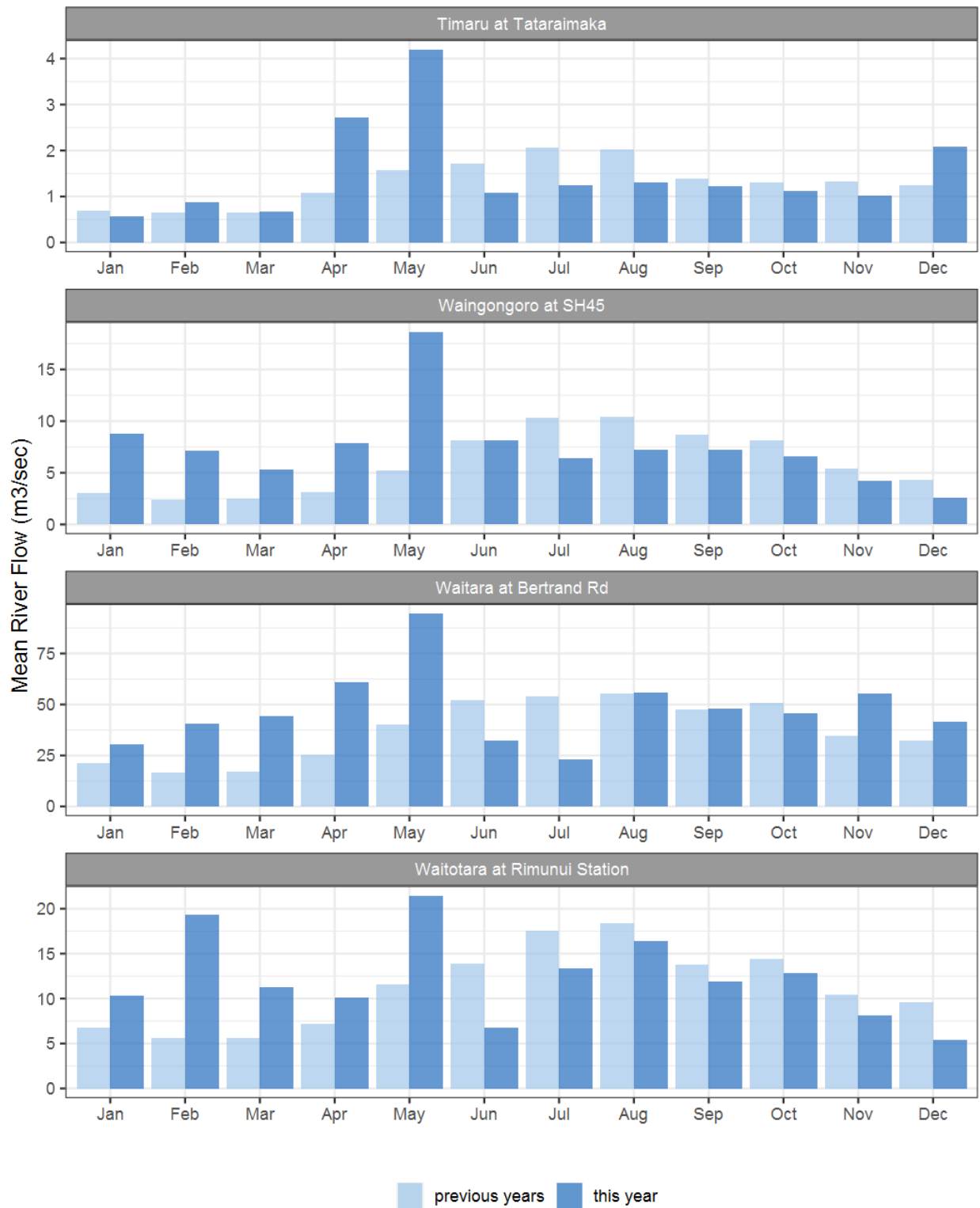


Figure 2.2: Monthly mean river flow for this month and the mean of all previously recorded months.

3. River Temperature

Map 3: December mean water temperature with difference to long-term mean (°C).

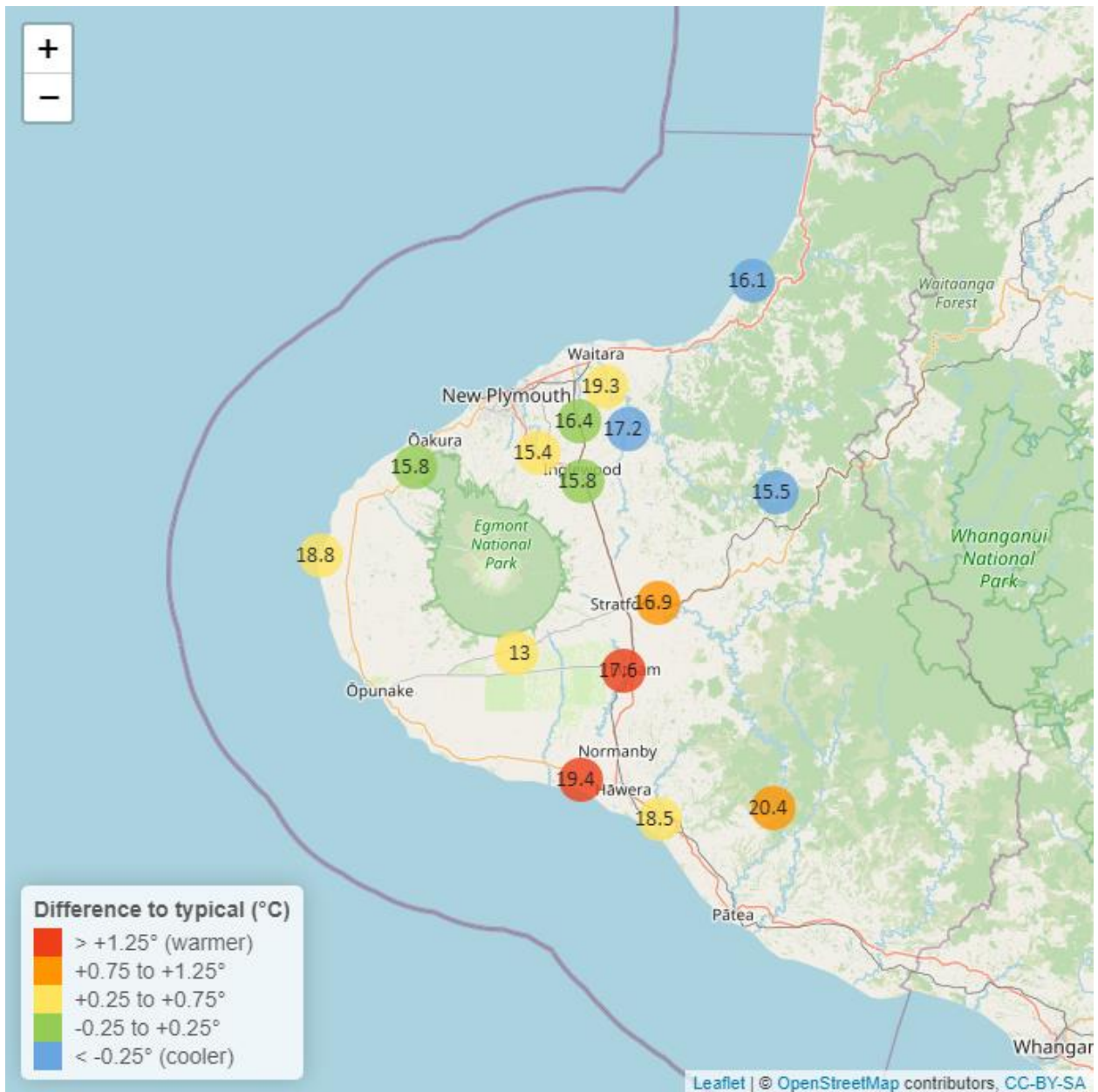


Table 3: Summary of high, low and mean river temperature for December and for December in all preceding years of record.

December 2023 - River Temperature (°C)								
River and Site	Highs		Lows		Mean		December maximum	Data years
	current month	historic	current month	historic	current month	historic		
Kapoaiaia at Lighthouse	23.2	22.4	15.6	14.6	18.8	18.2	24.5	24
Manganui at Everett Park	20.6	20.9	14.4	14.5	17.2	17.5	21.5	15
Mangawheroiti Above Intake W.W	16.0	14.7	10.5	10.1	13.0	12.3	18.0	11
Matau at Woolshed	19.1	20.3	12.6	13.1	15.5	16.0	21.5	6
Ngatoro at SH3	18.9	19.2	12.9	12.6	15.8	15.9	20.6	25
Patea at McColls Bridge	23.2	23.5	17.5	16.2	20.4	19.5	24.6	9
Patea at Skinner Rd	20.7	19.5	13.7	13.1	16.9	16.1	22.2	19
Tangahoe below Railway Bridge	22.6	21.0	15.3	15.1	18.5	17.9	24.5	6
Timaru at Tataraimaka	19.1	19.8	13.4	13.1	15.8	16.0	20.3	10
Waikaramarama at Bridge	18.2	18.6	14.1	14.2	16.1	16.5	19.8	6
Waingongoro at Eltham Rd	21.4	19.8	14.1	13.1	17.6	16.3	22.6	19
Waingongoro at SH45	23.3	21.0	15.8	14.8	19.4	17.9	25.4	18
Waiongana at SH3a	19.7	19.7	13.8	13.5	16.4	16.4	20.9	12
Waitara at Bertrand Rd	22.5	22.1	16.9	15.6	19.3	18.7	23.3	32
Waiwhakaiho at Egmont Village	18.9	18.3	12.5	11.9	15.4	15.0	20.6	32

3.2 Long-term data patterns

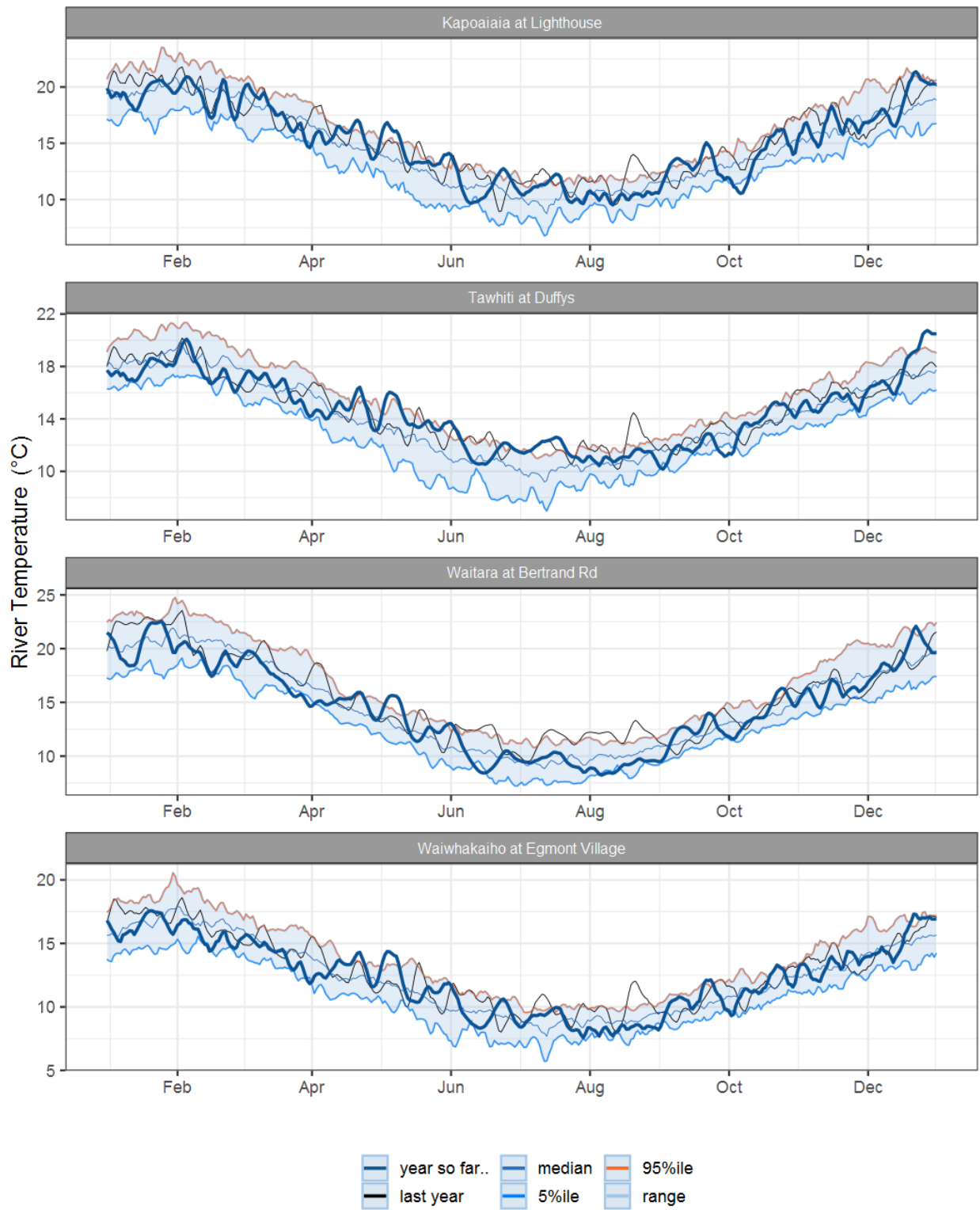


Figure 3.1: Running average river temperature for selected sites, set in context of the historic record.

3.3 Monthly Bar Charts

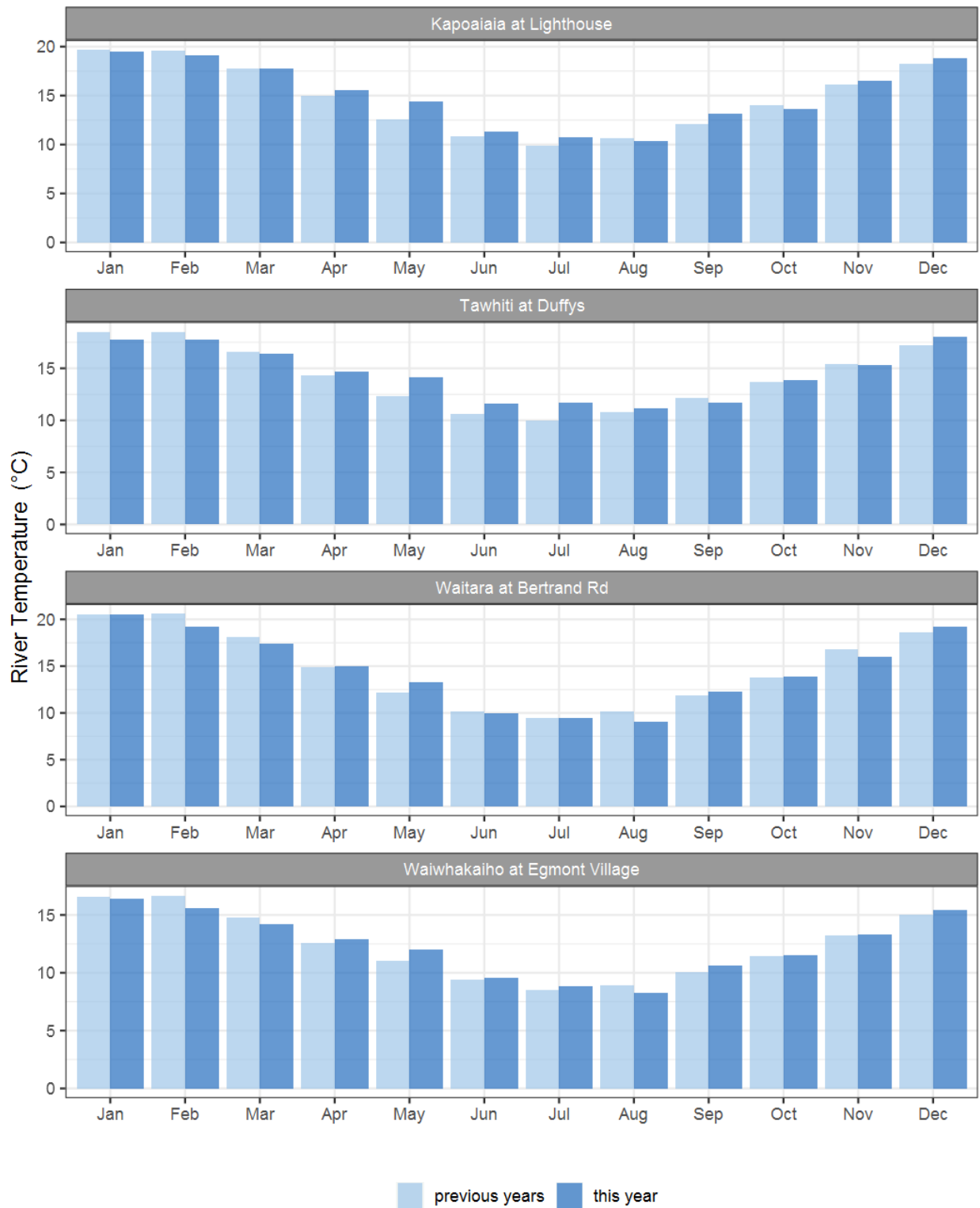


Figure 3.2: Monthly mean river temperature for this month and the mean of all previously recorded months.

Table 4: Summary of high, low and mean air temperature for December and for December in all preceding years of record.

December 2023 - Air Temperature (°C)								
River and Site	Highs		Lows		Mean		December maximum	Data years
	current month	historic	current month	historic	current month	historic		
Brooklands Zoo at New Plymouth	23.7	23.9	12.80	11.70	18.0	17.7	27.1	11
Dawson Falls	18.8	18.6	7.18	6.21	13.4	12.3	21.4	8
Inglewood at Oxidation Ponds	23.6	23.2	11.40	9.84	17.2	16.5	27.5	12
Kapoaiaia at Lighthouse	20.6	20.9	13.90	12.60	17.3	17.1	23.8	11
Kaupokonui at Glenn Rd	22.7	21.5	12.50	11.50	17.6	16.5	25.6	8
Mangorei Upper at Forest Hill	20.3	20.7	10.70	10.60	15.5	15.5	22.9	6
Motunui M39 at Weston W3	21.2	21.7	12.80	11.70	17.2	17.1	23.5	7
North Egmont at Visitors Centre	17.7	18.2	6.34	6.50	12.3	12.3	20.7	9
Patea at Bore 3	22.1	21.4	12.10	11.80	17.3	16.8	25.7	12
Stony at Mangatete Bridge	21.2	21.6	12.00	11.80	16.5	16.6	23.8	7
Taungatara at Eltham Rd	20.7	20.9	12.10	11.50	16.5	16.1	23.8	8
Tawhiti at Duffys	22.4	21.5	11.40	9.82	17.2	16.4	25.9	10
Uruti at Kaka Rd	21.3	21.1	11.50	10.40	16.1	15.8	23.9	5
Waitotara at Hawken Rd	23.5	22.6	12.40	12.00	18.0	17.4	26.3	7
Weraweraonga at 749 Mangawhio Rd	24.3	23.6	11.20	10.90	18.0	17.4	27.2	6

4.2 Long-term data patterns

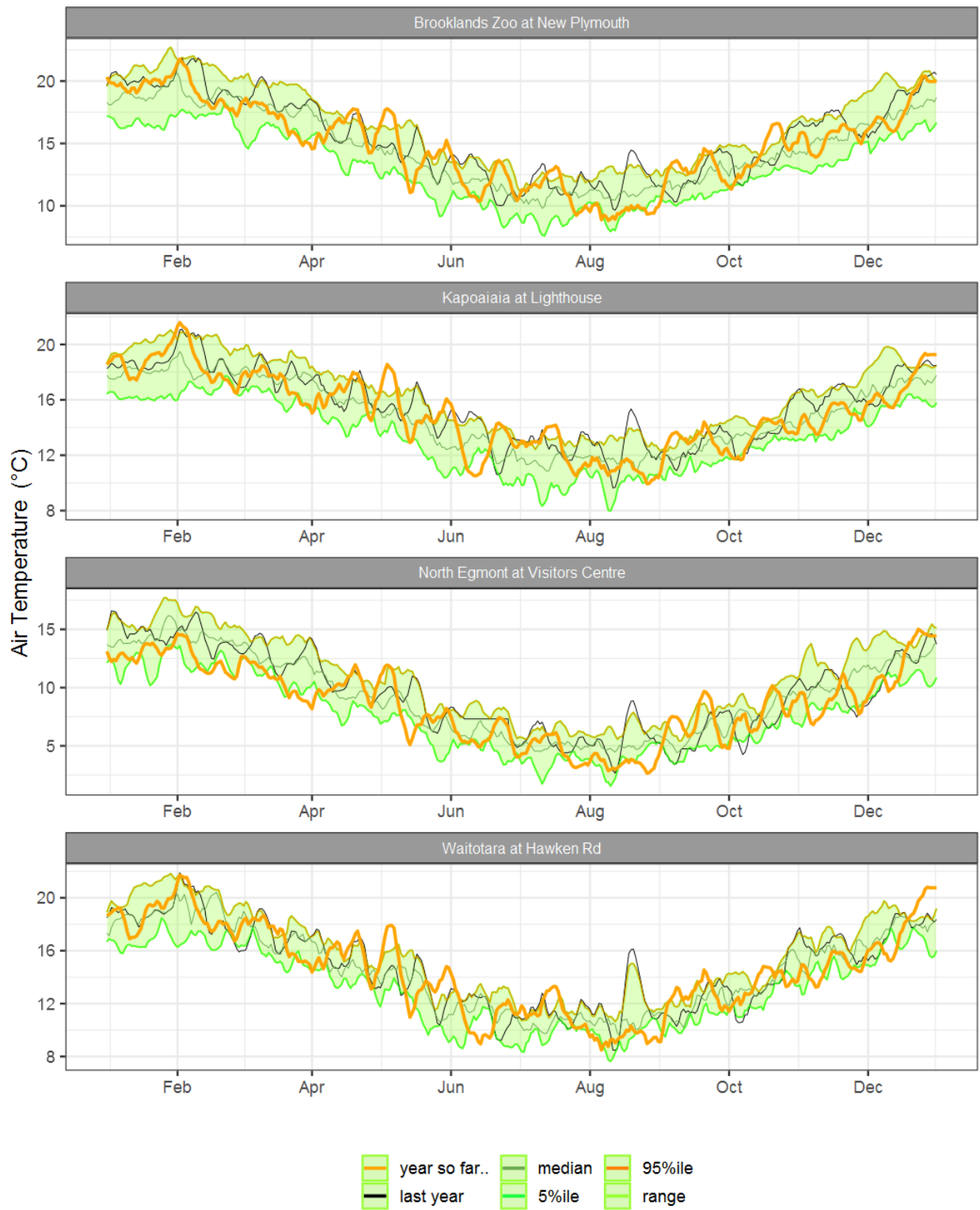


Figure 4.1: Running average air temperature for selected sites, set in context of the historic record.

4.3 Monthly Bar Charts

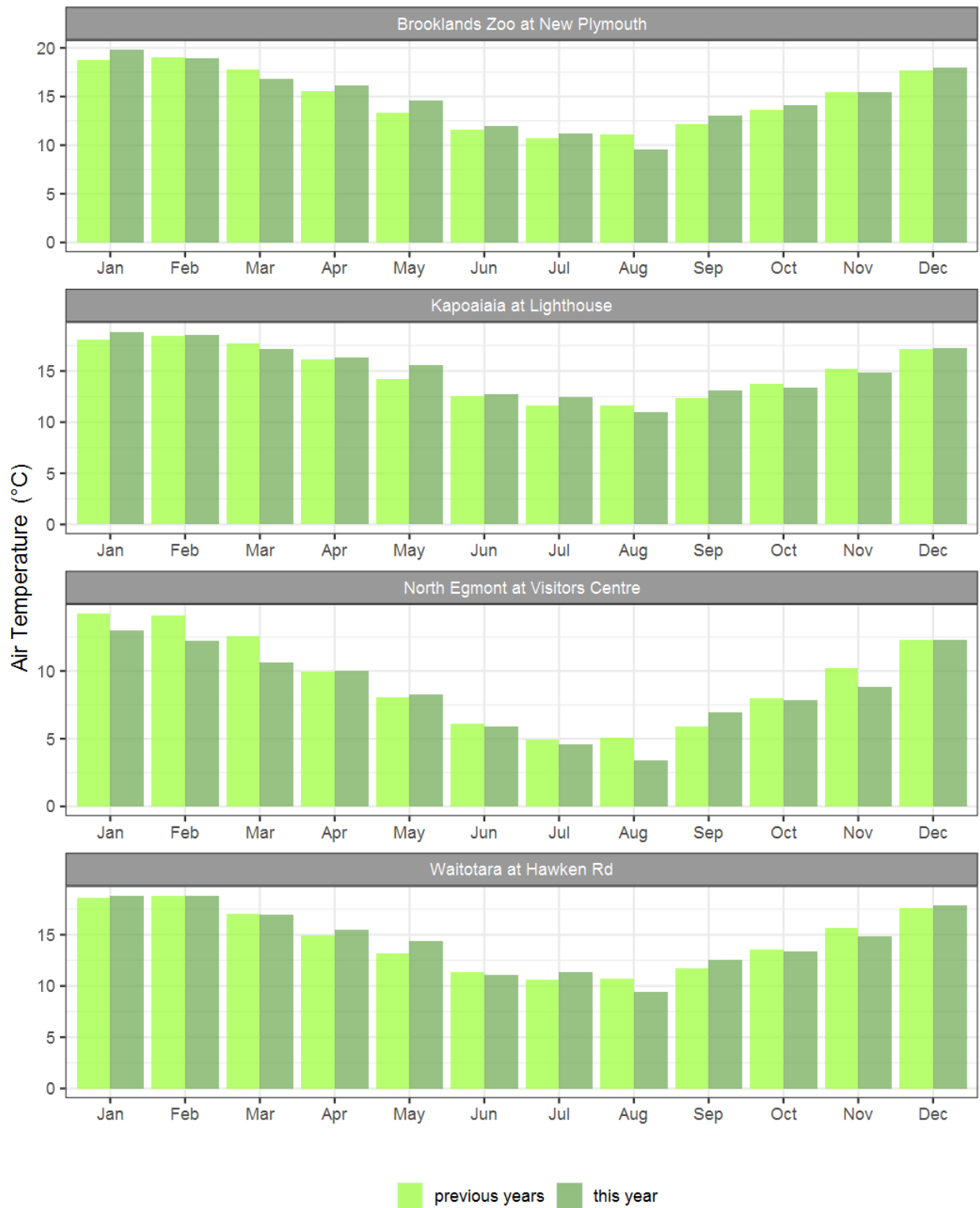


Figure 4.2: Monthly mean air temperature for December and the mean of all previously recorded months.

5. Soil Moisture

Map 5: December mean soil moisture content (%).

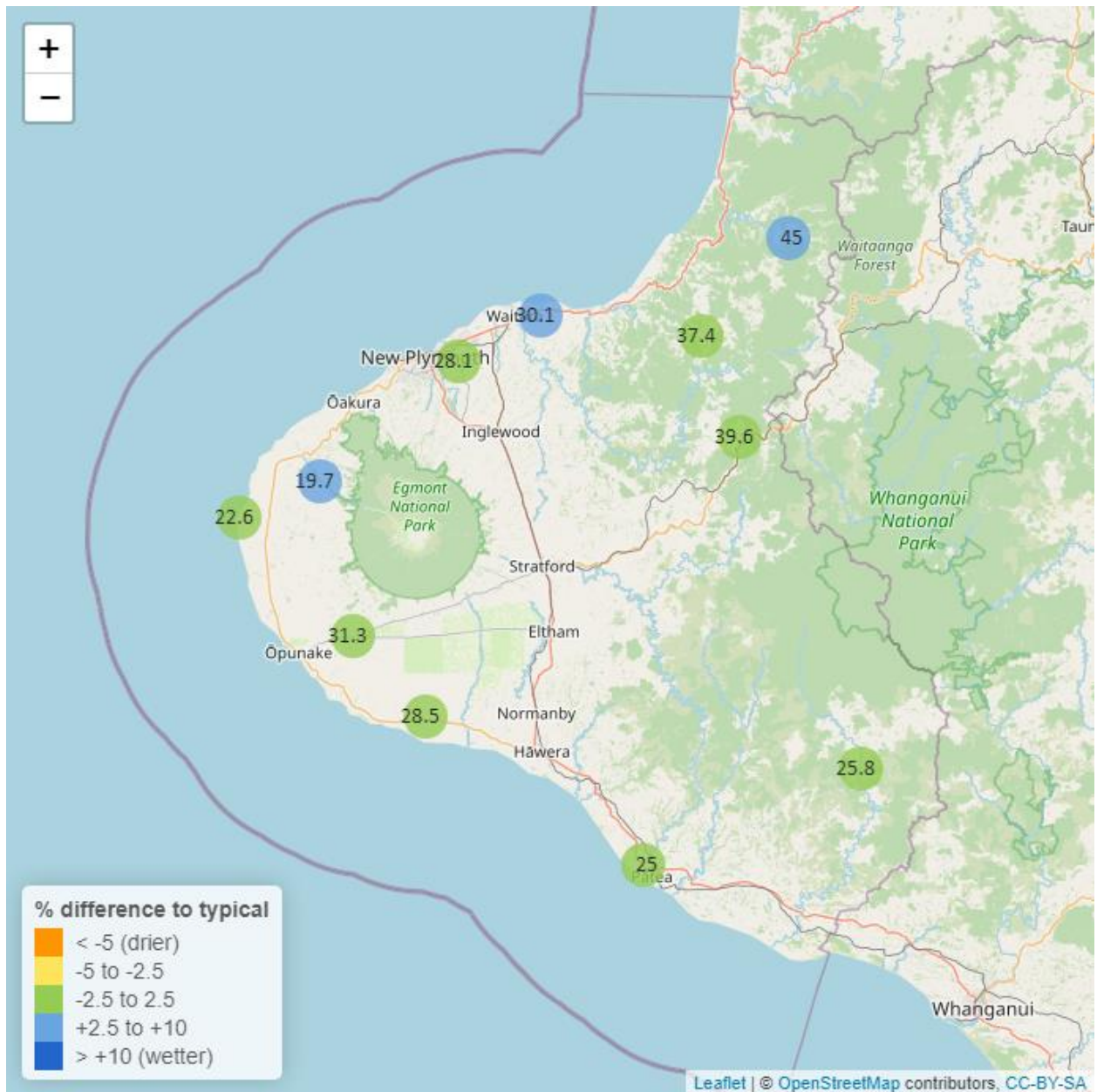


Table 5: Summary of high, low and mean soil moisture for December and for December in all preceding years of record.

December 2023 - Soil Moisture (%)								
River and Site	Highs		Lows		Mean		December maximum	Data years
	current month	historic	current month	historic	current month	historic		
Kapoaiaia at Lighthouse	24.3	28.6	20.5	10.10	22.6	21.4	24.5	11
Kaupokonui at Glenn Rd	31.7	35.2	23.4	8.78	28.5	27.3	31.9	12
Kotare at OSullivans	51.6	47.6	41.5	23.20	45.0	37.5	57.9	11
Motunui M39 at Weston W3	32.0	31.6	27.9	15.50	30.1	26.3	33.6	10
Patea at Bore 3	27.5	31.1	21.5	21.30	25.0	27.0	27.7	7
Pohokura Saddle	44.0	50.8	32.9	32.00	39.6	41.5	46.8	9
Stony at Mangatete Bridge	24.9	24.2	14.4	9.81	19.7	16.2	29.6	7
Taungatara at Eltham Rd	35.4	42.2	26.3	15.50	31.3	31.9	35.8	10
Uruti at Kaka Rd	40.1	44.8	34.8	22.90	37.4	37.8	40.4	12
Waitotara at Rimunui Station	28.4	29.1	23.8	19.20	25.8	25.2	28.9	6
Waiwhakaiho at Hillsborough	30.1	31.4	26.4	15.10	28.1	25.9	32.1	11

5.2 Long-term data patterns

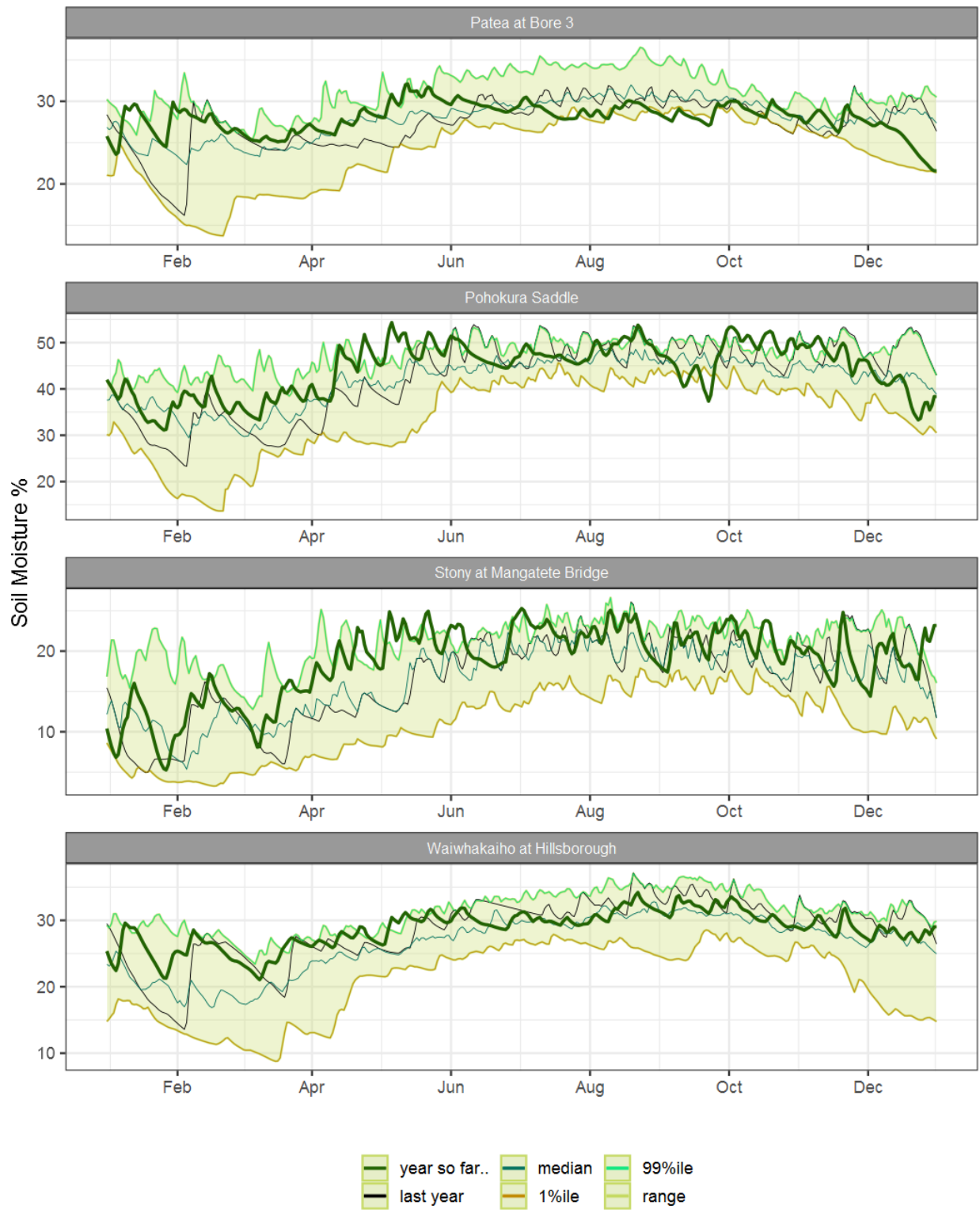


Figure 5.1: Running average soil moisture for selected sites, set in context of the historic record.

5.3 Monthly Bar Charts

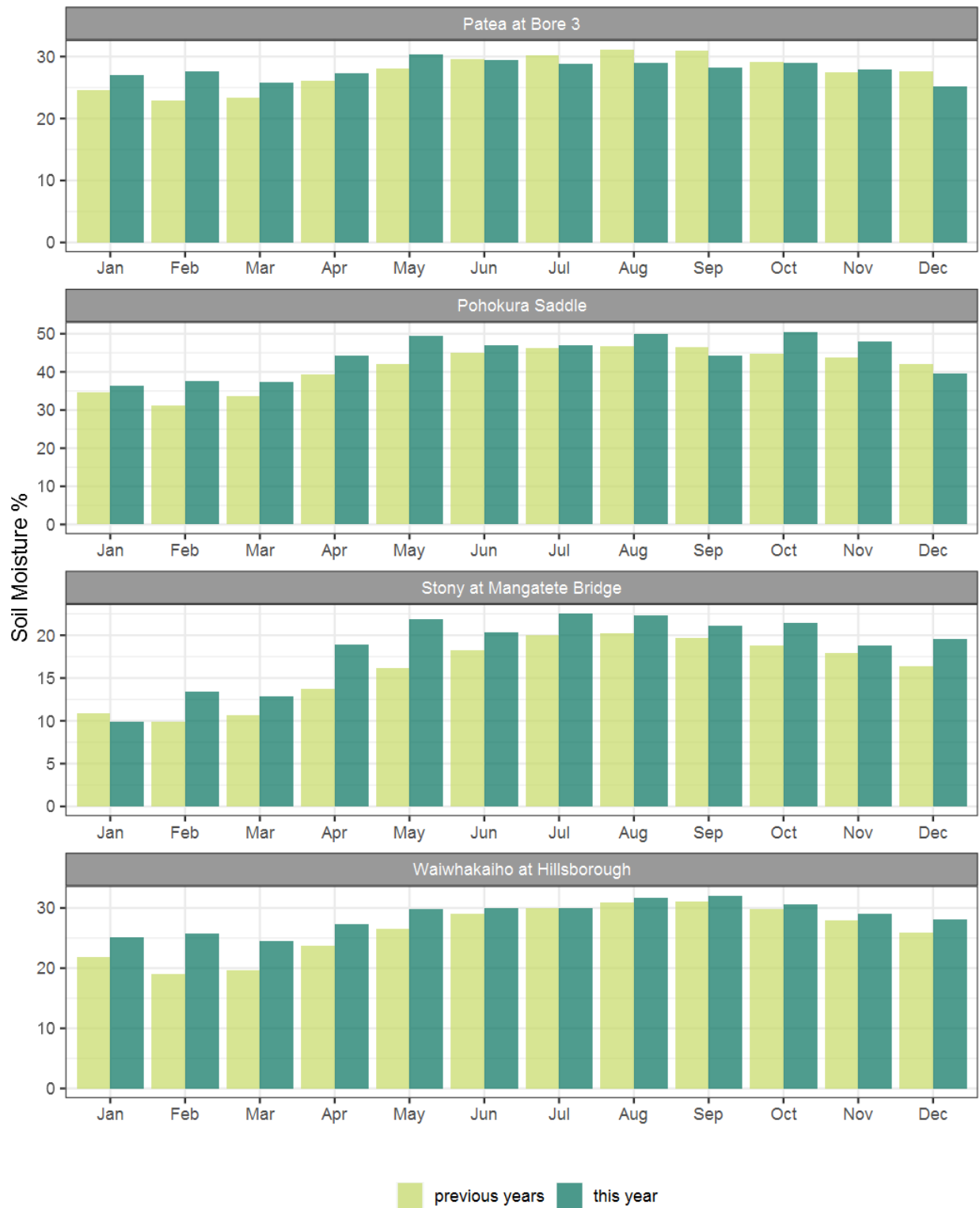


Figure 5.2: Monthly mean soil moisture for this month and the mean of all previously recorded months.

6. Soil Temperature

Map 6: December mean soil temperatures with difference to long-term mean (°C).

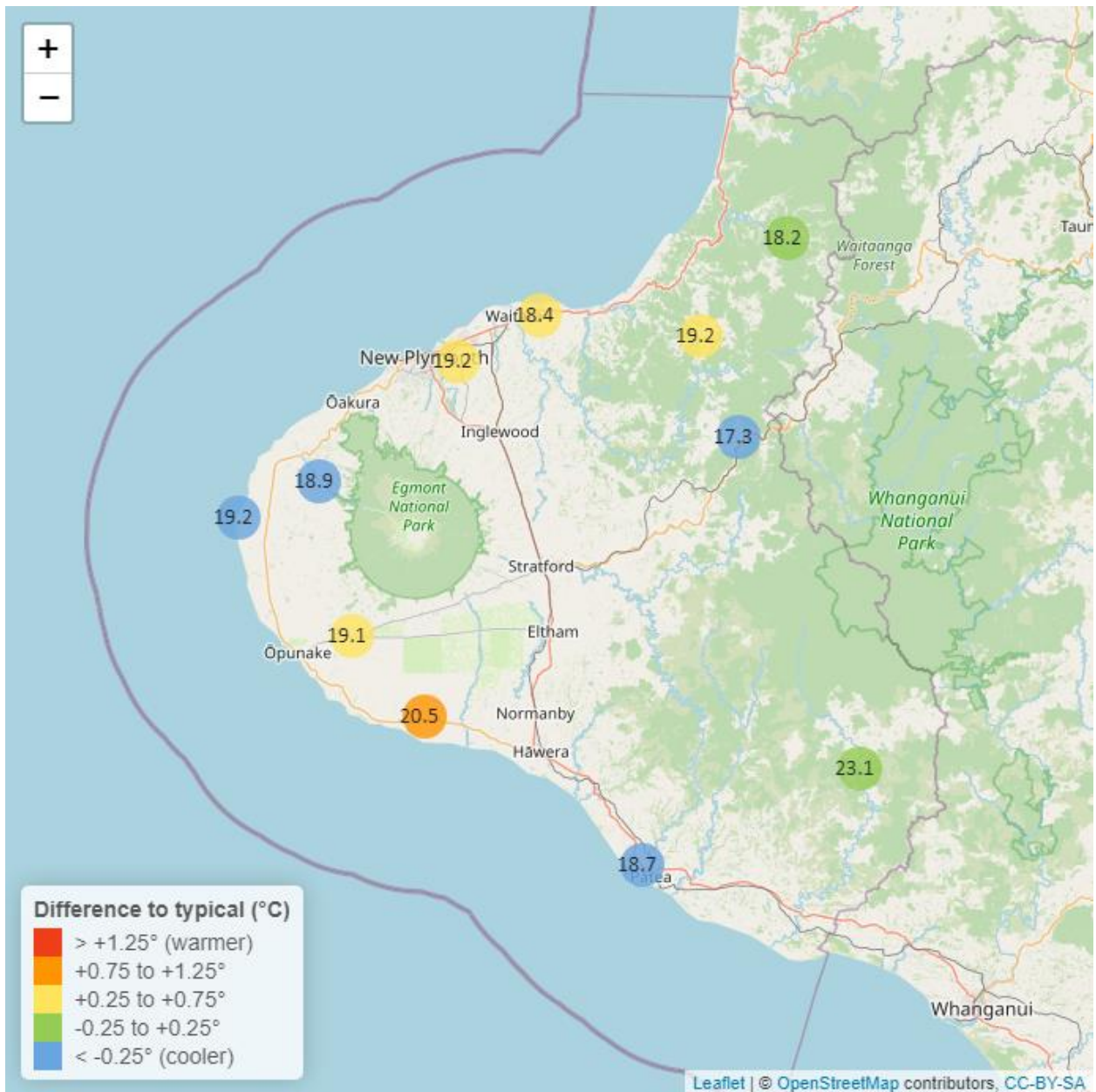


Table 6: Summary of high, low and mean soil temperature for December and for December in all preceding years of record.

December 2023 - Soil Temperatures (°C)								
River and Site	Highs		Lows		Mean		December maximum	Data years
	current month	historic	current month	historic	current month	historic		
Kapoaiaia at Lighthouse	21.6	23.7	16.7	17.0	19.2	19.9	22.8	11
Kaupokonui at Glenn Rd	23.0	22.9	18.3	16.3	20.5	19.3	24.0	12
Kotare at OSullivans	22.1	21.7	14.8	15.1	18.2	18.2	22.9	11
Motunui M39 at Weston W3	20.8	20.7	16.3	15.6	18.4	18.1	21.4	10
Patea at Bore 3	21.5	24.9	16.4	17.6	18.7	20.8	22.2	7
Pohokura Saddle	19.9	20.3	15.3	15.8	17.3	18.1	20.6	9
Stony at Mangatete Bridge	20.9	23.3	16.6	17.1	18.9	20.0	21.4	6
Taungatara at Eltham Rd	22.6	21.3	16.3	15.8	19.1	18.4	23.7	10
Uruti at Kaka Rd	21.5	21.6	17.5	16.7	19.2	18.9	21.8	12
Waitotara at Rimunui Station	26.7	26.2	19.9	20.3	23.1	23.1	28.1	6
Waiwhakaiho at Hillsborough	21.5	21.9	17.0	16.3	19.2	18.8	22.2	11

6.2 Long-term data patterns

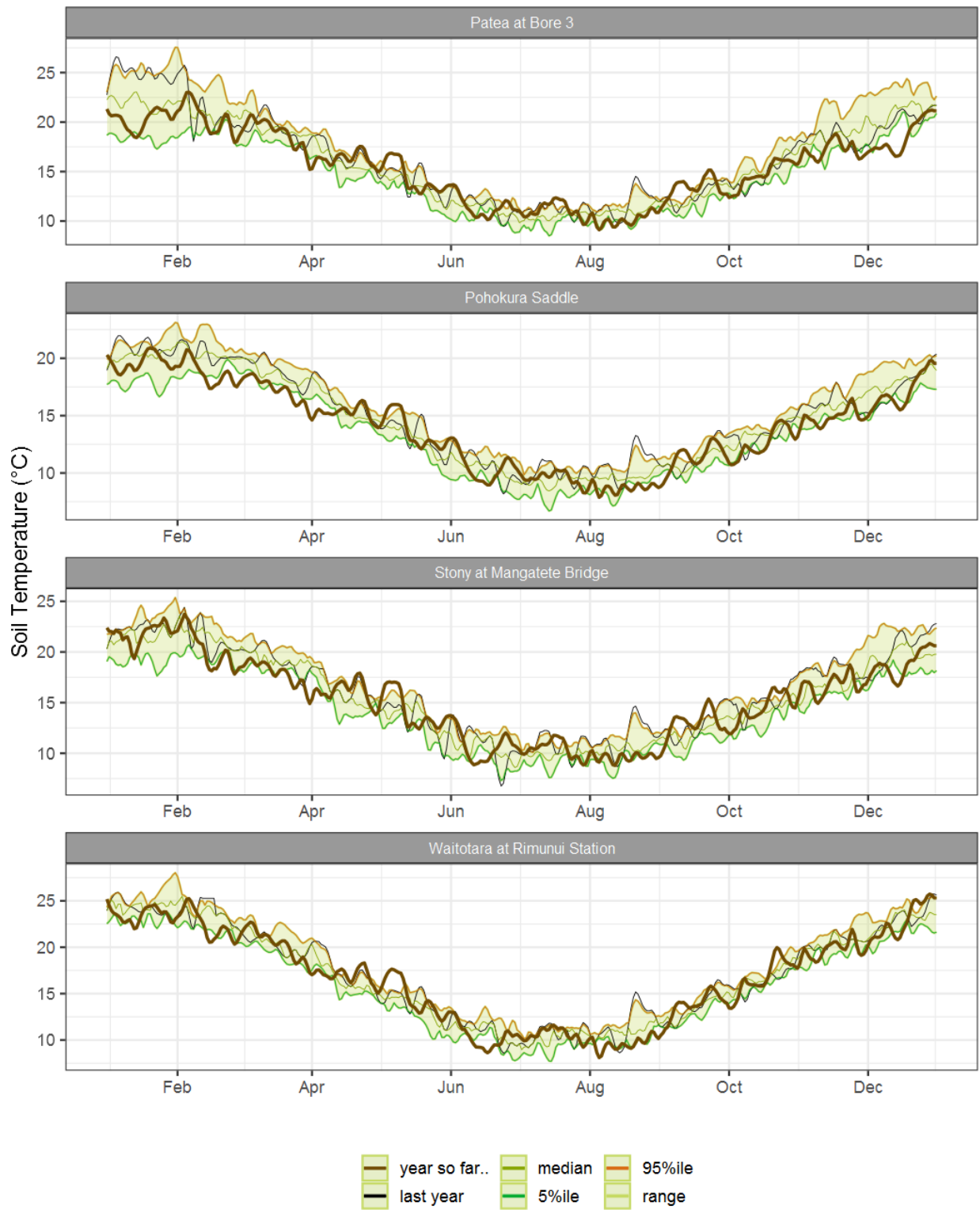


Figure 6.1: Running average soil temperature for selected sites, set in context of the historic record.

6.3 Monthly Bar Charts

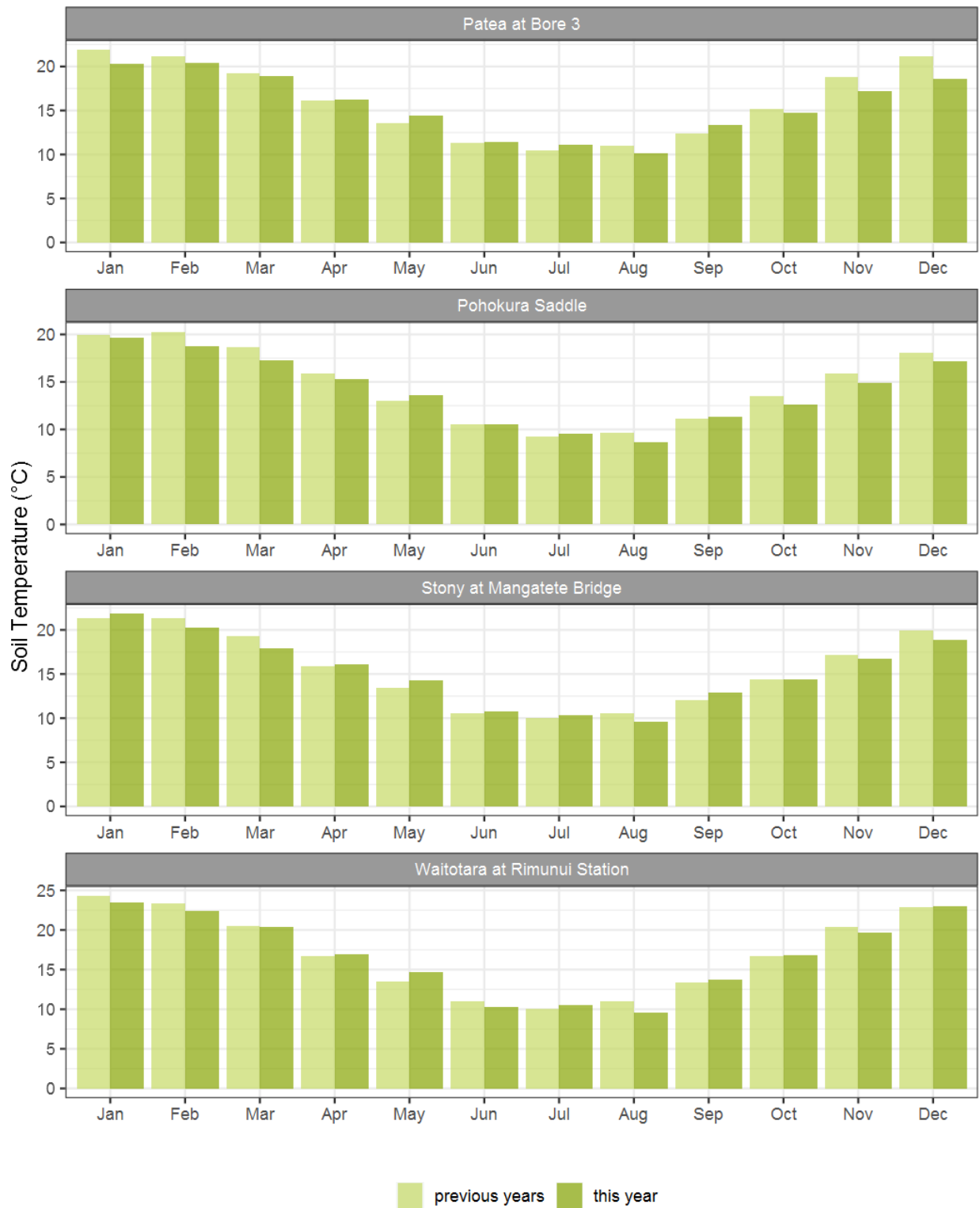


Figure 6.2: Monthly mean soil temperature for this month and the mean of all previously recorded months.

7. Wind Speed and Maximum Gusts

Map 7: December mean of wind speed with difference to long-term values (km/hr).

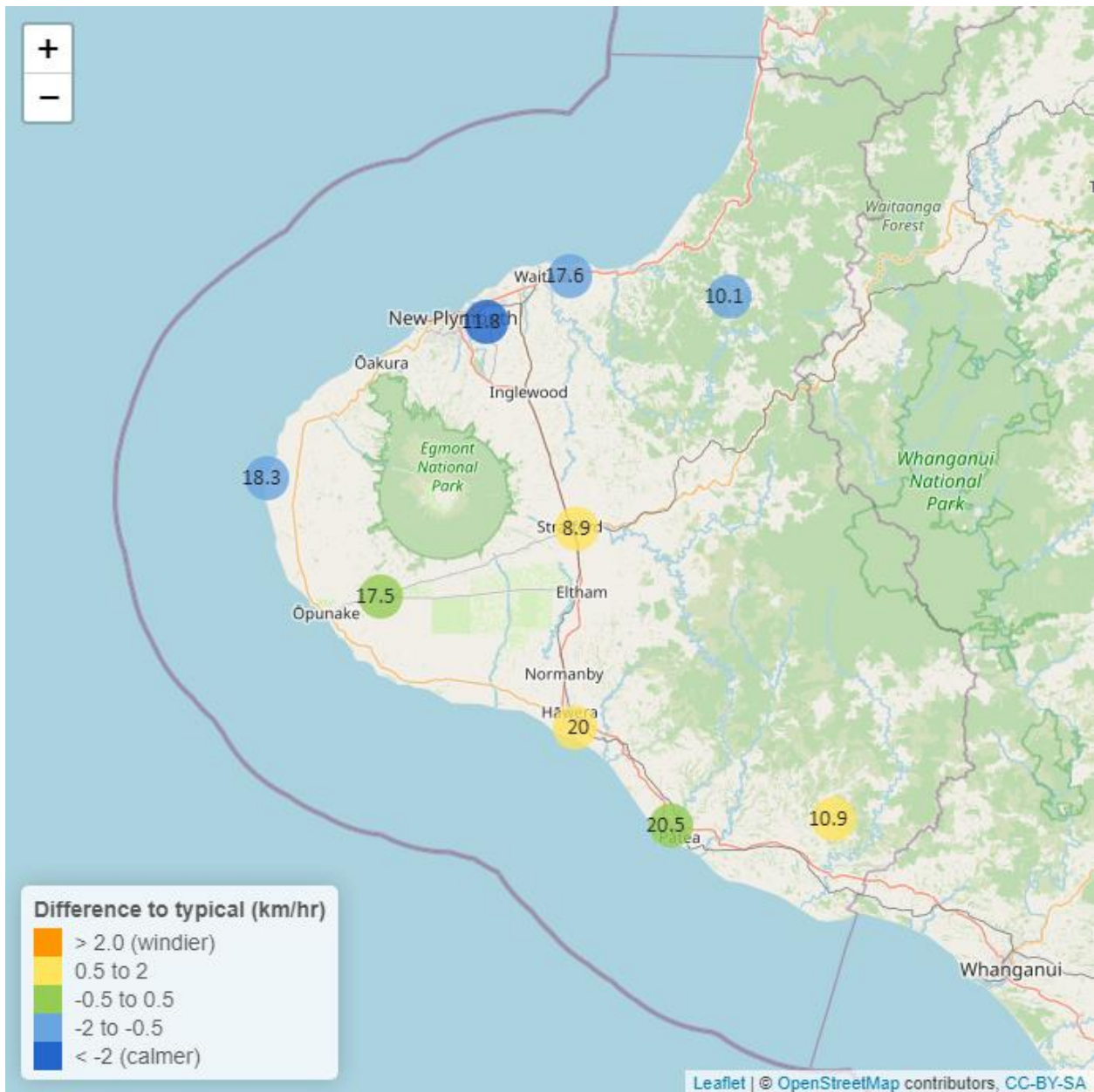


Table 7: Summary of high, low and mean wind speed for December and for December in all preceding years of record.

December 2023 - Wind Speed (average) - (km/hr)								
River and Site	Highs		Lows		Mean		December maximum	Data years
	current month	historic	current month	historic	current month	historic		
Hawera AWS	36.1	35.2	5.56	5.56	20.0	18.6	45.4	18
Kapoaiaia at Lighthouse	32.0	36.9	5.35	6.33	18.3	19.8	49.5	23
New Plymouth AWS	36.9	37.0	5.56	5.56	17.6	18.8	51.9	16
Patea at Bore 3	40.0	38.2	5.83	6.13	20.5	20.8	52.0	8
Patea at Stratford	17.6	18.0	1.92	2.04	8.9	8.3	27.2	17
Taungatara at Eltham Rd	32.6	31.8	5.26	6.54	17.5	17.3	45.0	8
Uruti at Kaka Rd	21.3	22.4	3.00	3.63	10.1	11.0	32.6	26
Waitotara at Ngutuwera	22.5	21.4	2.29	1.80	10.9	10.4	35.6	24
Waiwhakaiho at Hillsborough	23.4	28.7	3.85	3.97	11.8	13.9	58.3	6

Table 8: Summary of high, low and maximum wind gusts for December and for December in all preceding years of record.

December 2023 - Wind Gusts (Maximum) - (km/hr)								
River and Site	Highs		Lows		Mean		December maximum	Data years
	current month	historic	current month	historic	current month	historic		
Hawera AWS	66.7	66.7	31.5	25.9	47.6	45.4	70.4	18
Kapoaiaia at Lighthouse	64.4	70.9	18.5	22.7	39.8	44.2	79.2	22
New Plymouth AWS	68.5	64.8	24.1	24.1	39.6	43.2	70.4	16
Patea at Bore 3	71.7	66.0	31.1	26.2	47.8	46.9	72.4	8
Patea at Stratford	64.8	54.7	18.4	22.3	37.2	36.3	64.8	17
Taungatara at Eltham Rd	74.8	69.8	27.1	27.6	46.2	45.1	77.7	8
Uruti at Kaka Rd	67.0	64.4	24.5	23.5	36.6	39.4	70.6	25
Waitotara at Ngutuwera	81.7	65.2	23.0	22.2	48.9	40.7	85.0	24
Waiwhakaiho at Hillsborough	73.9	65.9	22.0	23.8	36.9	41.9	85.3	6

7.2 Long-term data patterns

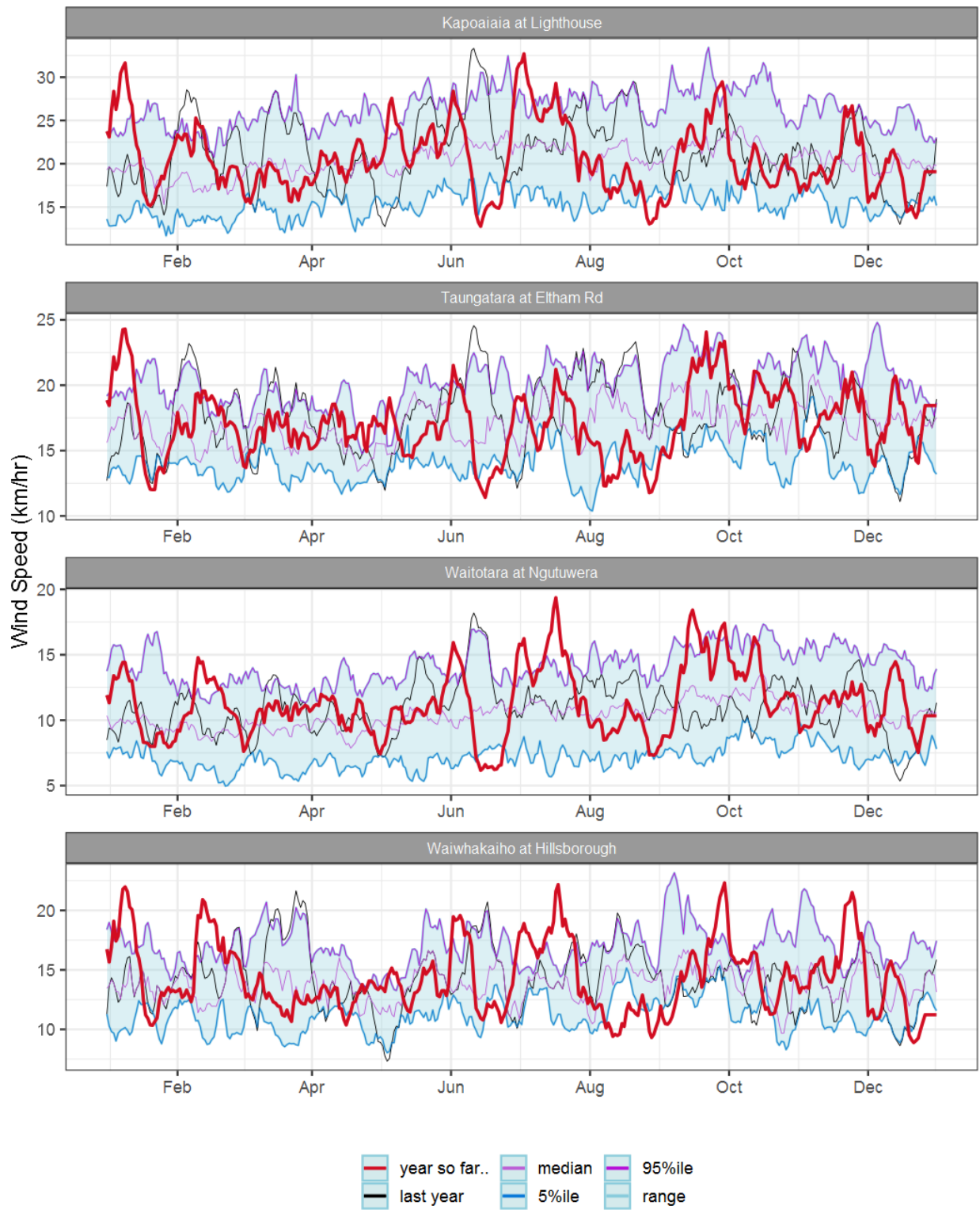


Figure 7.1: Running average wind speed (km/hr) for selected sites, set in context of the historic record.

7.3 Monthly Bar Charts

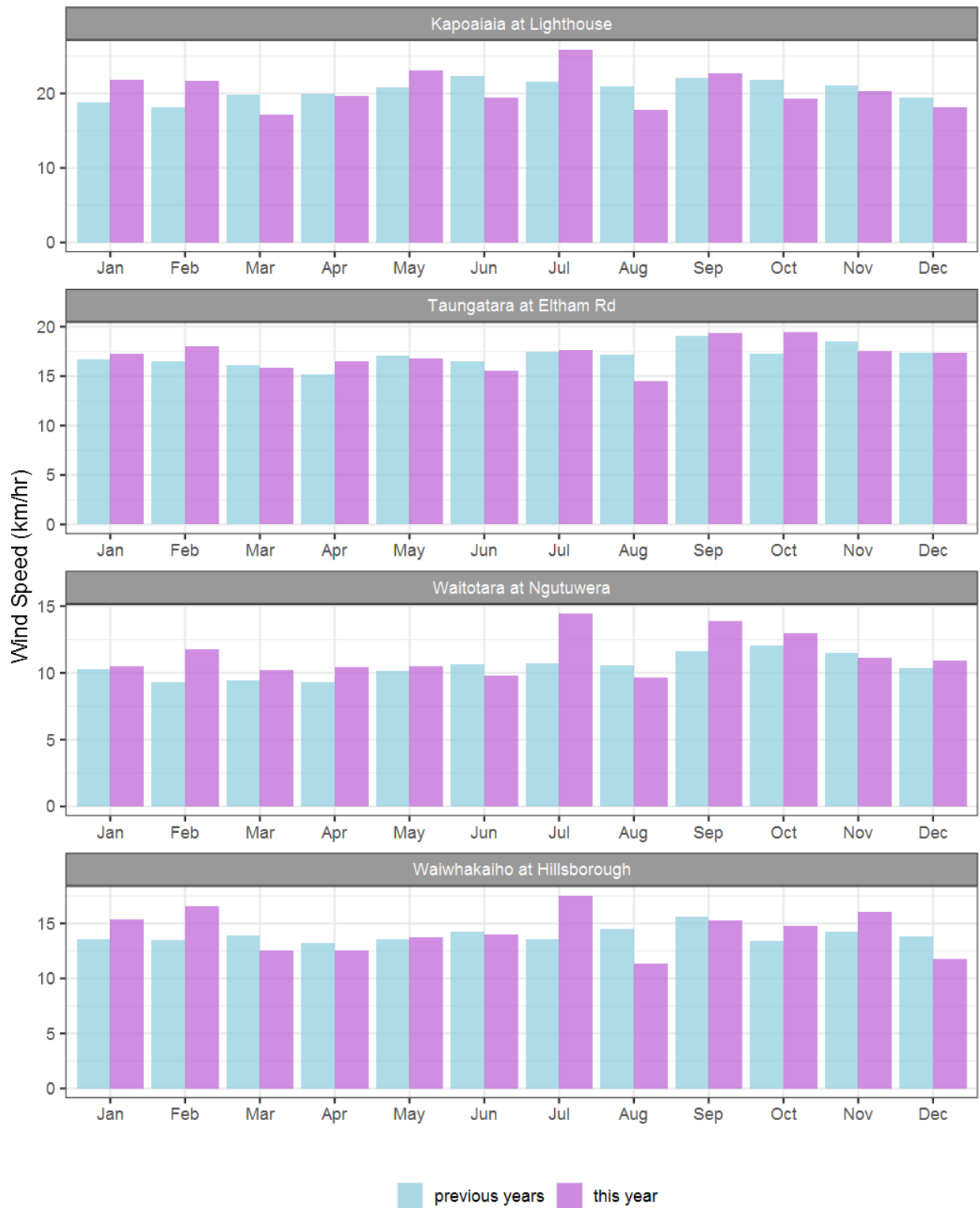


Figure 7.2: Monthly mean wind speed (km/hr) for selected sites, relative to the mean of all previously recorded months.

7.4 Wind roses for December 2023

Average windspeed

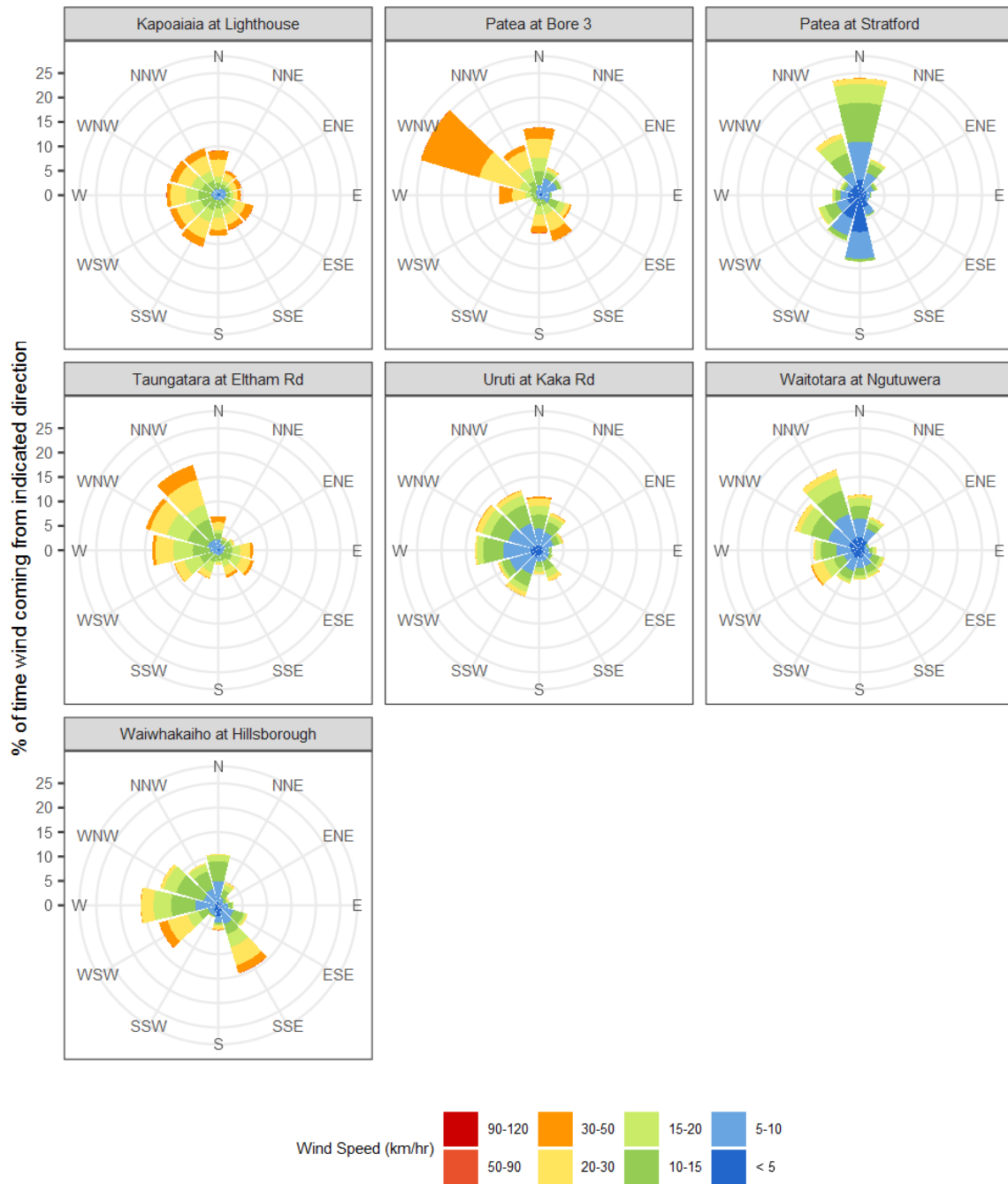


Figure 7.3: Wind roses for December for average wind speed (km/hr).

Maximum gust strength

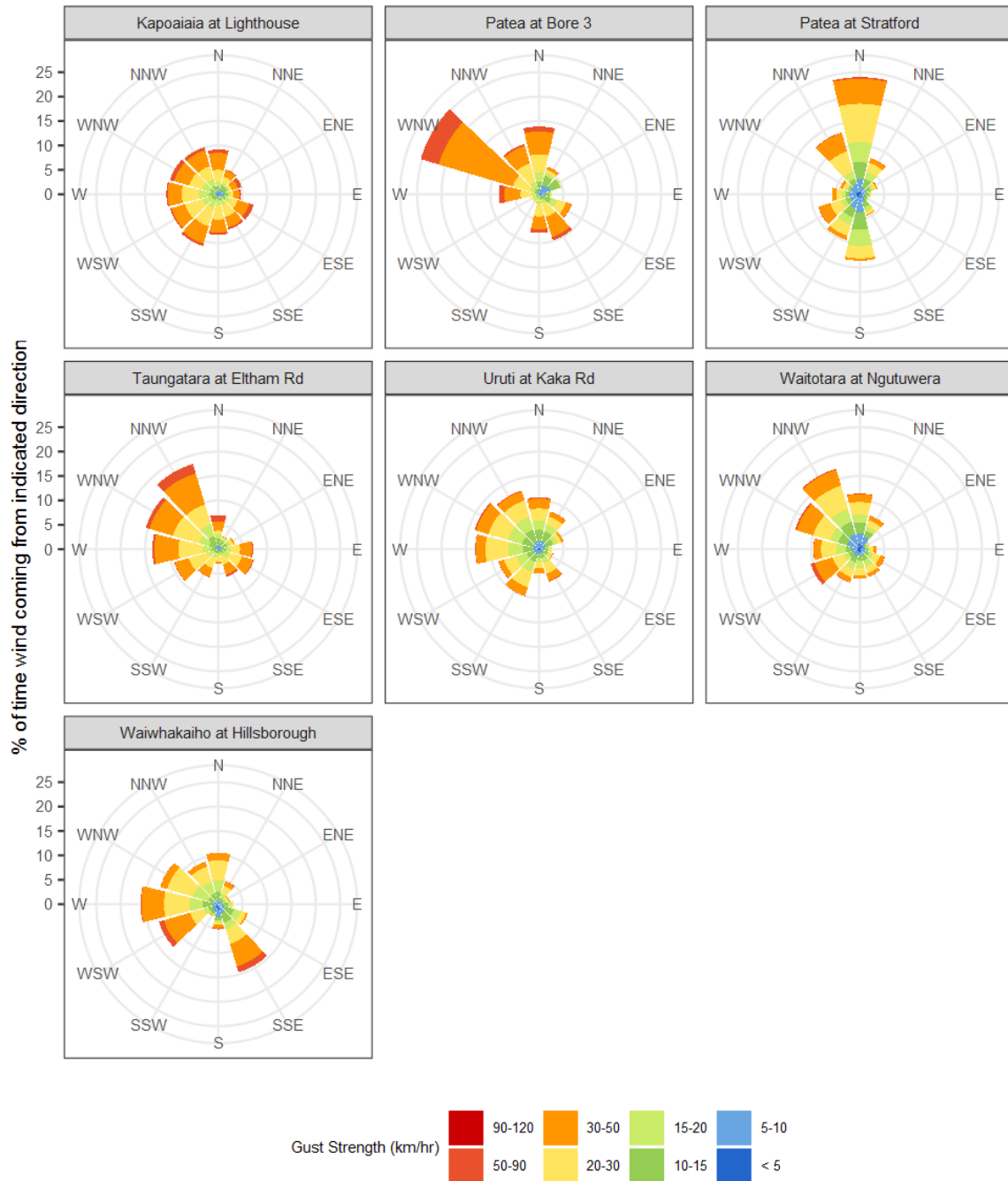


Figure 7.4: Wind roses for December for maximum wind gust (km/hr).

8. Summary of month's conditions

Rainfall

On average December rainfall was 159.1 mm, 3% less than usual, ranging from 60% less rain at Kaupokonui at Glenn Rd, and 61% more than at Waiwhakaiho at Hillsborough.

The years rainfall for 2023 ranged from 12% less rainfall at Omahine at Moana Trig, and 10% more rainfall at Omaru at Charlies, with an average of 2% less than for a typical year. So, on average, sites have received 98% of a typical years rainfall total.

River Flow

Mean river flows for December were 30.3% lower than typical values, low flows were 11% greater, and high flows 27.2% lower than typical values. The maximum river flow recorded in December was 343 m³/sec at Waitara at Bertrand Rd.

River Water Temperature

Mean river (non-mountain) water temperatures were 17.2°C, an average of 0.4°C warmer than long-term December values. Nighttime-low water temperatures were on average 0.5°C warmer than historic lows, and day-time high temperatures were on average 0.5°C warmer than historic highs. The maximum river water temperature recorded in December was 26.6°C at Kapuni at Normanby Rd.

Air Temperature

The average December air temperature for the region (excluding Te Maunga sites) was 16.6°C, which is 0.4°C warmer than long-term December averages. Low air temperatures for December were on average 0.8°C warmer than the December average for previous years. Day-time high temperatures were on average 0.2°C warmer than historic highs. The maximum air temperature recorded in December was 27.5°C at Inglewood at Oxidation Ponds.

Soil Moisture

The average soil moisture for December across sites in Taranaki region was 30.3%. Soil moistures were on average 1.4% wetter than typical December values. On average, low soil moistures were 9.1% wetter than previous lows, and the highs were on average 2.4% drier than previous values for December.

Soil Temperature

December soil temperatures were generally 0.2°C cooler than long-term averages. Average nighttime low soil temperatures were 0.1°C warmer than recorded lows, and upper day-time soil temperatures were on average 0.6°C cooler than long-term December highs. The maximum soil temperature recorded in December was 28.1°C at Waitotara at Rimunui Station.

Wind Speed (average and 10 minute gust)

December average wind speeds were 15.8 km/hr, with average gust strength of 42.9 km/hr, these were 0.5 km/hr lighter, and 0.4 km/hr weaker than the long-term average. Average calm weather wind speeds were 0.4 km/hr lighter than recorded lows, and windy conditions were on average 0.9 km/hr lighter than long-term December highs. The maximum wind gust recorded in December was 85.3 km/hr at Waiwhakaiho at Hillsborough.

Notes: Low and high values refer to the upper and lower 5th percentiles of the historic record for each site (wind, river flow and soil moisture are upper and lower 1st percentiles). These percentile values give a better indication of the general upper and lower range of the historic data against which to compare the current month. For example, minimum air temperature, because it is the lowest recorded value, accentuates the difference of the current month's colder conditions relative to the historical data. The start year (records began) for each site and variable in the respective tables shows the length of data used to compute historic highs, lows, and "typical values". Sites with a longer data record will generally provide a more reliable comparison to values in the current year.

Report date: 15 January, 2024.