Met Data summary for September 2020 for the Blenheim Meteorological station located at the Grovetown Park campus of the Marlborough Research Centre.

September 2020 recorded the highest sunshine hours on record, above average mean temperature, above average rainfall, above average evapotranspiration, above average number of frosts and well above average wind-run.

Table 1: Weekly weather data during September 2020

|  | Mean $\operatorname{Max}\left({ }^{\circ} \mathrm{C}\right)$ | $\begin{aligned} & \hline \text { Mean } \\ & \operatorname{Min}\left({ }^{\circ} \mathrm{C}\right) \\ & \hline \end{aligned}$ | Mean |  | Ground Frosts | Air Frosts | Rainfall (mm) | Sunshine (hours) | Wind-run $(\mathrm{km})$ (km) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $1^{\text {st }}-7^{\text {th }}$ | 16.3 | 6.6 | 11.5 | (+0.4) | 2 | 1 | 10.2 | 46.1 | 213.1 |
| $8^{\text {th }}-14^{\text {th }}$ | 17.8 | 4.0 | 10.9 | (-0.2) | 3 | 1 | 5.8 | 59.3 | 265.7 |
| $15^{\text {th }}-21^{\text {st }}$ | 17.6 | 6.6 | 12.1 | (+1.0) | 0 | 0 | 23.0 | 65.3 | 344.7 |
| $22^{\text {nd }}-28^{\text {th }}$ | 19.7 | 10.0 | 14.8 | (+3.7) | 0 | 0 | 25.6 | 66.8 | 416.4 |
| $29^{\text {th }}-30^{\text {th }}$ ( 2 days) | 12.3 | 1.0 | 6.7 | (-4.4) | 1 | 1 | 0 | 22.8 | 318.5 |
| $\begin{aligned} & 1^{\text {st }}-30^{\text {th }} \text { September } \\ & 2020 \end{aligned}$ | $\begin{aligned} & 17.5 \\ & (+1.3) \end{aligned}$ | $\begin{aligned} & \hline 6.4 \\ & (+0.4) \end{aligned}$ | 11.9 | (+0.8) | $\begin{aligned} & 6 \\ & (+1.4) \end{aligned}$ | $\begin{aligned} & 3 \\ & (+2.2) \end{aligned}$ | $\begin{aligned} & 64.6 \\ & (123 \%) \end{aligned}$ | $\begin{aligned} & 260.3 \\ & (135 \%) \\ & \hline \end{aligned}$ | $\begin{aligned} & \hline 310.6 \\ & (113 \%) \\ & \hline \end{aligned}$ |
| September LTA (1986-2019) | 16.2 | 6.0 | 11.1 |  | 4.6 | 0.8 | 52.5 | 193.4 | 274.1 |

LTA - Long Term Average

## Temperature

Mean temperature of $11.9^{\circ} \mathrm{C}$ was $0.8^{\circ} \mathrm{C}$ above the long-term average (LTA) temperature for September (1986-2019) of $11.1^{\circ} \mathrm{C}$.

September 2019 mean temperature was $11.1^{\circ} \mathrm{C}$.
September 2018 mean temperature was $11.1^{\circ} \mathrm{C}$.
September 2017 mean temperature was $11.9^{\circ} \mathrm{C}$.
The average daily maximum temperature for September 2020 was $17.5^{\circ} \mathrm{C} ; 1.3^{\circ} \mathrm{C}$ above the LTA. This is the highest average daily maximum temperature since September 2006.
The average daily minimum temperature was $6.4^{\circ} \mathrm{C} ; 0^{\circ} 4^{\circ} \mathrm{C}$ above the LTA.
The coldest day was 30 September which recorded an air minimum temperature of $-1.0^{\circ} \mathrm{C}$ and grass minimum temperature of $-4.6^{\circ} \mathrm{C}$. This was the coldest September day since 12 September 2012 which recorded an air minimum of $-1.1^{\circ} \mathrm{C}$ and a grass minimum of $-7.8^{\circ} \mathrm{C}$.
The warmest day was 9 September which recorded a maximum air temperature of $22.1^{\circ} \mathrm{C}$. But not as warm as 31 August.

The August weather summary detailed that the $30^{\text {th }}$ and $31^{\text {st }}$ August 2020 both broke the previous highest daily maximum temperatures ever recorded for August, with maximums of $21.6^{\circ} \mathrm{C}$ and $23.8^{\circ} \mathrm{C}$ respectively. The first three days of September brought an abrupt halt to the few warm days at the end of August. The $1^{\text {st }}$ to $3^{\text {rd }}$ of September recorded maximum daily temperatures of $14.8^{\circ} \mathrm{C}, 11.8^{\circ} \mathrm{C}, 12.4^{\circ} \mathrm{C}$ respectively; $9^{\circ} \mathrm{C}$ to $12^{\circ} \mathrm{C}$ lower than the maximum on 31 August.

The fourth week of September was very warm, $3.7^{\circ} \mathrm{C}$ above the LTA. However, the final two days of September were very cold, $4.4^{\circ} \mathrm{C}$ lower than the LTA. The maximum daily temperatures on 29 and 30 September of $12.6^{\circ} \mathrm{C}$ and $12.0^{\circ} \mathrm{C}$ respectively, were lower than the average daily maximum temperatures normally experienced in June and July.

## 9am Soil Temperatures

All soil temperatures were above average for September
10 cm mean temperature was $10.5^{\circ} \mathrm{C} ; 1.2^{\circ} \mathrm{C}$ above the LTA for September
20 cm mean temperature was $10.5^{\circ} \mathrm{C} ; 0.4^{\circ} \mathrm{C}$ above the LTA for September
30 cm mean temperature was $11.5^{\circ} \mathrm{C} ; 0.7^{\circ} \mathrm{C}$ above the LTA for September
100 cm mean temperature was $12.1^{\circ} \mathrm{C} ; 0.9^{\circ} \mathrm{C}$ above the LTA for September

## Frosts

6 ground frosts were recorded during September 2020 and 3 air frosts (above average)
In addition to the 6 ground frosts recorded during September, there were a further 6 days on which the ground temperature was between 0 and $-1.0^{\circ} \mathrm{C}$. These days do not count as ground frosts. A ground frost is any temperature equal to or below $-1.0^{\circ} \mathrm{C}$.
The last time that Blenheim recorded 3 air frosts in September was in 2009.
4 ground frosts were recorded during September 2019 and no air frosts
3 ground frosts were recorded during September 2018 and no air frosts
LTA is 4.6 ground frosts and 0.8 air frosts

## Sunshine

260.3 hours sunshine for September is $135 \%$ of the long term average for September of 193.4 hours. September 2020 is now the sunniest September on record for Blenheim for the 91 years 1930 to 2020. The previous sunniest was September 2011 which recorded 248.9 hours sunshine.

September 2019 recorded 215.4 hours sunshine.
September 2018 recorded 231.8 hours sunshine.
September 2017 recorded 183.9 hours sunshine.
Total sunshine for January to September 2020 is 1941.9 hours; $109 \%$ of the long-term average.

## Race for sunniest town in New Zealand in 2020

Blenheim has now recorded the highest sunshine hours of any town in New Zealand for three months in a row (July-September). Blenheim's sunshine total of 260.3 hours in September was well ahead of Napier in second place with 249.9 hours sunshine and Richmond in third place with 232.4 hours sunshine.

Blenheim has significantly closed the gap on the two towns that have recorded more sunshine in 2020. At the end of September Blenheim is in third place for total sunshine hours for the first nine months of 2020.

| Richmond | 1981.3 hours |
| :--- | :--- |
| Whakatane | 1972.2 hours |
| Blenheim | 1941.9 hours ( 39.4 hours behind Richmond) |

At the end of June Whakatane was in first place, 137.9 hours ahead of Blenheim, whereas at the end of September Whakatane is only 30.3 hours ahead of Blenheim.

## Rainfall

Rainfall total of 64.6 mm is $123 \%$ of the long-term average for September of 52.5 mm . This is only the third month in 2020 to have recorded above average rainfall.

September 2019 rainfall was 63.4 mm .
September 2018 rainfall was 36.2 mm .
September 2017 rainfall was 49.8 mm .

Table 2: Total rainfall for the 9-months January to September

| Year | Total <br> $(\mathrm{mm})$ | \% of long-term <br> Average |
| :--- | :--- | :--- |
| 2020 | 334.4 | $69 \%$ |
| 2019 | 499.2 | $103 \%$ |
| 2018 | 659.6 | $136 \%$ |
| 2017 | 521.0 | $107 \%$ |
| 2016 | 425.6 | $88 \%$ |
| 2015 | 355.4 | $73 \%$ |
| 2001 lowest | 229.8 | $47 \%$ |
| 1995 highest | 837.9 | $172 \%$ |
| Long-term average | 486.3 | - |

The January to September 2020 rainfall total of 334.4 mm is the fifth lowest on record for the 91 years 1930 to 2020. The rainfall deficit for the nine months January to September 2020 is 151.9 mm ( $486.3 \mathrm{~mm}-334.4 \mathrm{~mm}$ )

## Wind

Average daily wind-run for Blenheim during September 2020 was 310.6 km ; well above the long-term average of 274.1 km . Average wind speed for September 2020 was $12.9 \mathrm{~km} / \mathrm{hr}$ compared to the long-term average of 11.45 $\mathrm{km} / \mathrm{hr}$.
September 2020 was the windiest September since 2010, which was exceptionally windy with average daily windrun of 351.7 km .
The windiest day of the month in Blenheim was 22 September with 570 km wind-run. The maximum wind-speed during the month was $75.6 \mathrm{~km} / \mathrm{hr}$, recorded on 29 September.
In the first half of September (1-15) only four days recorded above average wind-run, whereas in the second half (1630) 11 days recorded above average wind-run; i.e. the first half of September was much calmer than the second half.

On many previous occasions over the last few years I have detailed how Blenheim has been fairly consistently recording below average monthly wind-run. Months with quite a few windy days and above average wind-run have become few and far between. However, September 2020 went against that trend. Average daily wind-run during September 2020 was the highest since January 2017; i.e. the highest monthly wind-run in the past 43 months.

## Evapotranspiration

Penman evapotranspiration for September 2020 was 93.3 mm compared to the LTA of 71.9 mm .
This is the highest evapotranspiration total for September over the 25 years 1996 to 2020; the period for which records are available.

## Soil Moisture

Long-term average shallow soil moisture for Blenheim during September is $34.6 \%$ (2003-2019). Soil moisture was very close to average at the start of September 2020 and with a number of rain events throughout the month the shallow soil moisture stayed close to average. However, with above average temperatures, wind-run, sunshine and evapotranspiration, water use by pasture would also have been above average in September.

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