Australian Meteorological Association Inc

Monana

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JUNE 2021

From the President's Pen

by Mark Little

With every adversity comes opportunity. Opportunity is, of course, always there, but adversity means that people need to move out of their comfort zone and grasp at those opportunities. The AMetA is no different.

The advent of COVID-19 shook up the AMetA, resulting in the loss of the free meeting room in Bureau Of Meteorology (BOM) building in the city and the suspension of the meetings due to social distancing concerns. The AMetA kicked off its physical meetings again at St. Saviour's Anglican Church, but the Committee is still looking for alternative meeting locations that are as close to the Central Business District (CBD) and as inexpensive as possible. For example, venues being investigated include hotels such as the Benjamin On Franklin that the AMetA has used before.

One of the major issues in selecting a venue is the cost of hiring the venue. Most organisations, including St Saviours, understandably, charge a fee for the use of their halls to cover the maintenance costs. Hotels also usually charge for the use of their meeting rooms, but often using a more indirect means. For example, one hotel will provide the room for free if the use of the room results in an additional $120 of turnover of food and/or drink for the hotel. If that does not occur, the meeting organisers have to cough up the $120. Another less centrally located hotel wants an extra $750 of turnover for the use of its room. The hunt to get another regular meeting venue is continuing. Personally, I prefer spending money on food and/or drink to pay for a meeting room, rather than just handing over cash (from the membership fees). Such meetings provide a greater incentive for members (and guests) to sit around, get to know each other better and discuss their meteorological interests.

Irrespective of how the meeting rooms get funded, it is apparent that one of the things that the AMetA need to do to ensure its financial security is to encourage more people to become members. It is in every member's best interest to encourage new members—this will provide the money the AMetA needs to operate and will help limit future membership increases that may be required to provide income to run their association.

The AMetA has become involved with the Port Adelaide Enfield (PAE) Council as part of the council's IoT (Internet of Things) monthly experimenters meetings starting at the Greenacres Library from 1pm to 3pm on the 20th June 2021. The council is also still running its Arduino Basics meetings as well. These meetings are free, so consider coming along.

Those present at the presentation by Dr Pushan Shah of the Environmental Protection Authority (EPA) will remember that Dr Shah expressed interest in exploring collaborative opportunities with the AMetA and others in relation to Air Quality measurement.

This is not a project that I expect to hit the ground running at top speed, because this is an entirely new enterprise for the AMetA and (I suspect) the EPA. For this project to be

successful it will require a range of skills, not just computer and electronic skills, so if you are interested, please have a chat with me.
Keep Happy, Keep Safe
Mark
President, Australian Meteorological Association

Editor's Note

This is a bumper edition of Monana with several people submitting articles for inclusion. It was a pleasure to receive them all. I hope you enjoy the publication and, maybe, are encouraged to contribute to future editions. If so that would be very much appreciated.

Thanks to all contributors.

Bruce Davis

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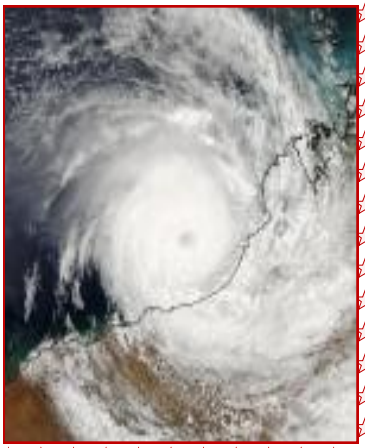
☸ ATTENTION ALL SCRIBES AND PHOTOGRAPHERS ☸

Members are encouraged to submit weather related articles and photos to monana@ameta.org.au for publication in *Monana*.



All the detail you could possibly want and more is available on the BoM website.

Visit http://www.bom.gov.au/climate and wander through the various archived climate reports and summaries which are available in text and graphical forms.

Another useful website is https://www.theweatherclub.org.uk/index.php/ *(Please note a little patience may be required when accessing this website as it can take some time to open)*

Recent Australian Climatic and Weather Events

By Beth Walton

Australian climate variations and seasonal weather are driven by several large scale atmospheric circulation features. Most, if not all, have their genesis in the natural variations of the underlying ocean circulation. During early autumn Australia was under the influence of a weakening La Nina event – which is discussed later. No other drivers were having a major influence in our region, although the Madden-Julian Oscillation, a tropical feature was showing signs of moving into our region.

Probably the most interesting feature of early autumn 2021 was Tropical Cyclone 'Seroja' which crossed the Western Australian coast just over 500 km north of Perth on 11 April. Forming south of Timor and then tracking southwest this cyclone was significant for several reasons. Firstly, as it moved south it came into close proximity with another short-lived Tropical Cyclone – 'Odette'. If you think for a moment about two cyclones nearing each other - both with clockwise winds (which in their central 'walls' exceeded 100 km/hr) – the winds will be in opposing directions – a turbulent situation – to say the least. This 'buddying' of tropical cyclones, known as the Fujiwhara Effect is most unusual and cannot be sustained. As a result Seroja 'absorbed' the weaker system and then tracked to the southeast – towards the Western Australian coast. Cyclones draw their energy from the warm ocean waters they traverse and anomalously warm waters which existed in this region enabled it to persist (See Fig 1). When it crossed the coast, it caused severe damage around the coastal town of Kalbarri where winds up to 170km/hr were recorded. Being a fast moving system, rainfall at any one location was modest by cyclone standards even though it contained a lot of moisture. The highest recording was 166.8mm.

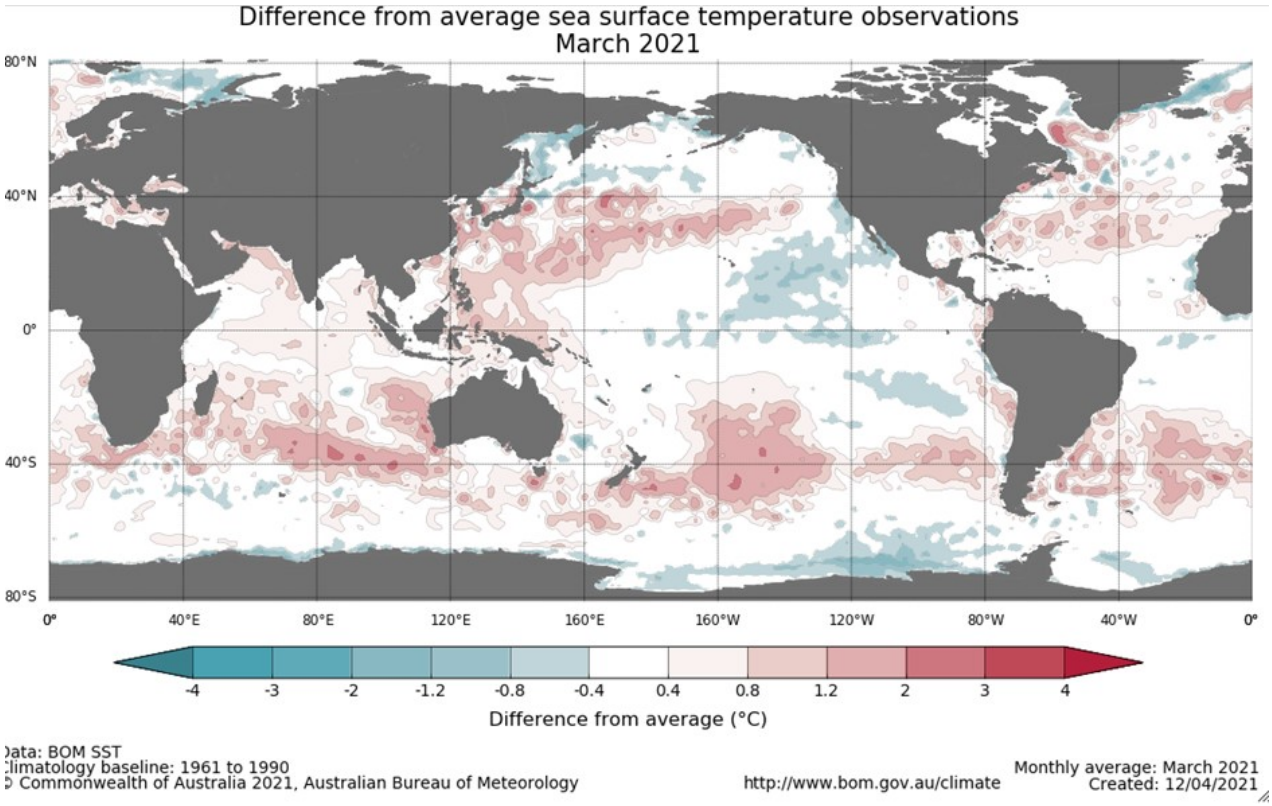


Figure 1. The average global sea surface temperature anomalies for March 2021. The warm waters immediately off the western Australian coast persisted into April.

As an aside, it is unusual for cyclones to track so far southwards – but it has occurred before. In April 1978 Tropical Cyclone 'Alby' moved into midlatitudes well out to sea off the Western Australian Coast. Warm SST anomalies in this region were also a feature of

this tropical cyclone season. Near Perth latitudes (~30°S) Alby was captured by upper westerly winds, transforming it into an extratropical low and turning its path southeastwards and then eastwards. During its transformation the central band of strong to storm force winds broadened out to a radius of around 450km inflicting severe wind damage (estimated at $50m) across a large part of WA south of Geraldton. While the centre did not cross the coast, the strongest recorded wind gust was 150km/hr at Albany as the system passed to the south. Five people died as a result of its destructive effects.

Now – back to 2020 and the waning La Nina. La Nina events typically produce above average rainfall across much of Australia, particularly in the eastern and northern parts; South Australia may or may not be affected. This most recent event commenced in September 2021 when cooling sea surface temperatures (SST) in the tropical Pacific dropped below the 'La Nina threshold" of 0.8°C less than the average SST in the region. Atmospheric indicators were also in La Nina territory - the Southern Oscillation Index (SOI) was strongly negative (~ < -7), the southeast trade winds were strengthening in the Pacific and cloudiness across the equatorial mid Pacific was supressed. See Fig 2 – showing typical features of a La Nina.

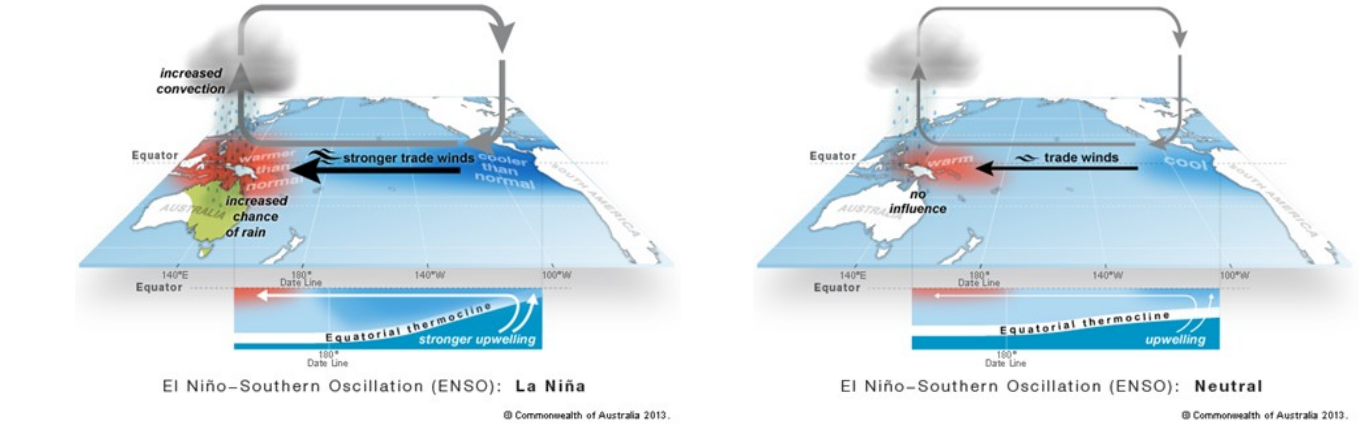


Figure 2.. Typical features of a La Nina event compared to neutral conditions. Note in particular the region in Australia most likely to receive above average rains under a La Nina. (Images from www.bom.gov.au)

By December with mid-Pacific SST no longer cooling - the La Nina had peaked, however atmospheric and meteorological features - such as above average rainfall - typically linger beyond this point in the cycle. Parts of Australia such as remote parts of South Australia' did receive above average summer and early autumn rains, but there were also parts of the eastern coast – where the enhanced chance of rain is more likely under a La Nina event - that missed out.

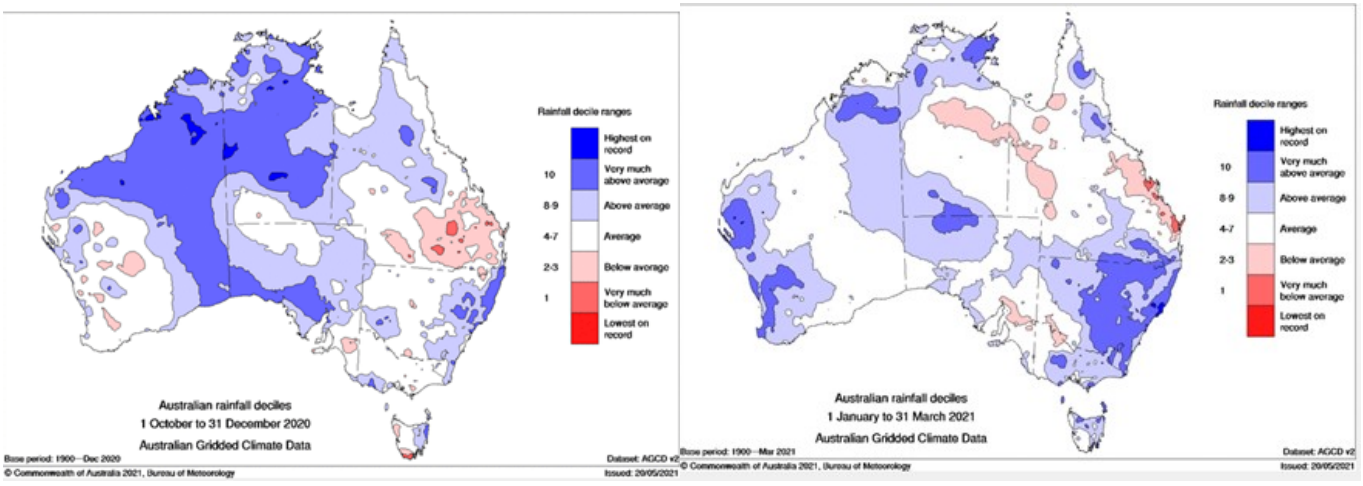
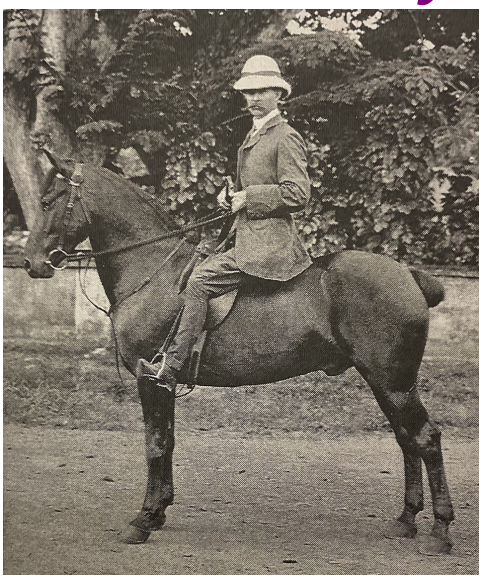


Figure 3. Australian rainfall anomalies for the 6 months October 2020 – March 2021

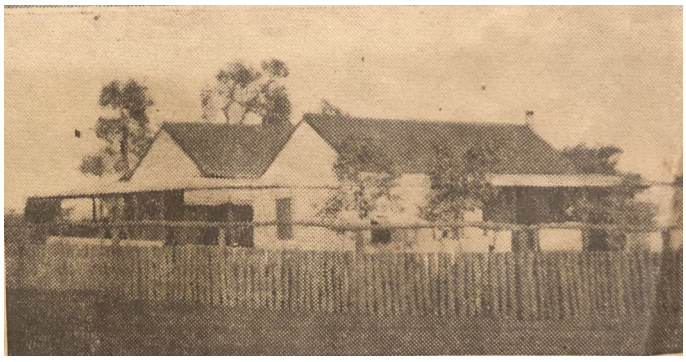
The 1938 Flood at Lambina Station
Contributed by Rose Brown (née Robb)



Jim Robb in India (1)

Early last century, my grandfather Jim (James Edward) Robb worked for one of the several Australian companies of horse traders who shipped horses to India for sale to the Indian Army and to Indian polo players. His skills in many aspects of horsemanship were recognised at an early age and he made many trips to India with that horse trader. In the 1920's, Jim formed his own trading company with his two sons, J.E. Robb & Sons, and in the 1930's, he took up pastoral leases in the far north of South Australia - first Lambina, later merging with Granite Downs - where he bred his own horses. When Jim first inspected the Lambina site he "found it ideal. Undulating country with quite a good covering of open scrub in many areas, several creek beds with soaks which indicated the possibility of successful bores on the sub-artesian basin, as well as long lasting waterholes after rains. The area, being SE of the Everard Ranges, would receive rain in the summer months from the down draught of the NW monsoonal storms, even if sporadic" (1)

Horses in a "*trap yard*" at a bore on Granite Downs, 1940 (2)



Lambina homestead before the 1938 flood (3)

In February 1938, "unusually heavy rains in central Australia" resulted in the Alberga River flooding, with a terrifying night for the Lambina Station's manager, his family and three white workmen. They spent all night high up in the boughs of a gum tree where they had climbed to safety. The flooding Alberga had "cut off the river bend at Lambina Crossing and flowed straight through the homestead". The story goes that they had not heeded a warning from local natives to go to higher ground as "big fella water was coming". A number of natives worked on the station, mainly working as stockmen and domestic servants, living in camps not far from the homestead. In one newspaper report, one of the natives "made an attempt to

Lambina homestead in ruins after the 1938 flood (3)

rescue the two white children, but he was forced back by the rising water". The natives were relieved to see the family safe the next day. Much of the detail presented here is taken from "Jim Robb", a book written by Jim's daughter, Maise Chettle (née Robb) many years later. (1)

A sample of the many newspaper reports of the flood event are shown below, (3)

Vivid Story By Aviator Of Flood Damage

GUM trees, torn out by their roots from the ground, lying on creek banks like matchwood . . . dead goats, cattle, and horses half covered in mud . . . the whole patchwork design of the hinterland changed by silt through which green foliage is springing.

These vivid impressions of the flood-ravaged country behind Oodnadatta were brought back by Roy Gropler, the young aviator who flew into the outback on Monday, and located the lost well-sinkers, L. Williams and D. Fuller.

Gropler said today that it would have been suicide for him to have attemped the flight without the assistance of the mailman, Alec McLeod. Before the floods, McLeod knew the country like a book, but was not sure at times during the flight of his bearings in the devastated landscape.

"The floods have washed out the whole country," Gropler said. "Silt lies everywhere. All the regular tracks are obliterated, and motoring is almost impossible. Parts of the country are cut off entirely from Oodnadatta, except by air.

Homestead on Island

"On the way out to the place where we hoped to find the men, we flew past Todmorden Station. Floods still surround it, and the homestead stands on an island.

"eBtween Mount Chandler and Moorylina Station we lost our way, and had to turn back, although we were only 75 miles from the point where we eventualy located the men.

"When we found the men, about 250 miles from Oodnadatta, we discovered that the ground was so boggy and covered with mulga that it would have been impossible to land."

Gropler noticed that Williams, who is 19, was bandaged and walking with a limp.

RELIEF PARTY RETURNS TO OODNADATTA

Station Staff's Flood Ordeal

NATIVE'S ATTEMPT TO SAVE WHITE CHILD

OODNADATTA, March 7.

Vast areas of Central Australia are almost unrecognisable since the recent Alberga River flood, according to the crew of a relief truck which returned to Oodnadatta yesterday after taking provisions to Lambinna station, the property of Mr. J. E. Robb, of Glenelg.

The trip occupied four days, instead of the usual one day.

Mr. A. McLeod, the driver of the truck, said that the aspect of the country had completely altered, and the flood had undoubtedly been the greatest since the coming of the first white settlers.

Water had reached almost to the tops of giant gum trees. Near the station homestead, household furniture, a three-ton waggon, and a buggy were caught among the highest branches.

A remarkable story was told the relief party by the station manager (Mr. Paige), who, with his wife, two children, and Messrs. Dansie, Fitzgerald, and Faggotter, station employes, took refuge in a gum tree when the Alberga broke its banks. Native station hands had reached safety on high ground before the flood was at its worst. One of them made an attempt to rescue the two white children, but he was forced back by the rising water.

When the white party had been four hours in the tree and the sun was setting, Faggotter, who is aged 19, turned to Dansie and said, "Ted, have a good look at the sunset. It may be the last you will see." Next morning, however, they were still in the tree, and when the flood had sufficiently receded, they waded waist-high in water to the raised ground.

The natives, who excitedly greeted them, at first could not see the white children, who were being carried by two of the men, and most of them burst into tears, crying that the "piccaninies" had been drowned.

Fitzgerald spoke highly of the fortitude shown throughout the ordeal by Mrs. Paige, who never once complained or showed the least sign of fear. Even when she realised that their only remaining possessions were the sodden clothes they wore, she seemed only thankful that the whole party had reached safety.

The relief party reports that the road from Kingoonya to Alice Springs is impassable and will require reconstruction

FLOODED STATION SHORT OF SUPPLIES

Relief Party Dispatched

OODNADATTA, March 4.

On Wednesday, Wallis Fogarty, Ltd., dispatched a truck in the charge of Mr. A. McLeod with food and supplies for Lambinna Station, which suffered severely in the floods a fortnight ago. The task, owing to the condition of the roads, seemed practically impossible, but with the assistance of four youths with picks and shovels, members of the party are determined to reach their destination, knowing that at the other end there are men, also the station manager's wife and children, short of food and other necessities. They have lost not only their home, but all they possessed in the floods. On starting out the party encountered its first setback, three miles from the town, when the truck became bogged. One of the party walked back to Oodnadatta for assistance, and Mr. Frank Wilkinson, manager of the local branch of Wallis Fogarty, Ltd., went out with another truck and pulled the first truck out of its bog. Although under normal conditions the relief party should have returned to Oodnadatta at midday on Thursday, at 4 p.m. on Friday it was still out, and nothing has been heard of it.

Fifteen Inches Of Rain

Mr. Victor Dumas, of Calpina Station, Musgrave Ranges, and Mr. Jack Killeen arrived at Finke Siding today after a bad trip, and reported that during the heavy rains which fell a fortnight ago, Kenmore Station, the property of Mr. George Fraser, had 15 inches of rain. Ernabella Mission Station had seven inches. All the roads out to the Musgrave Ranges have been washed away, and new roads will have to be cut. They report that several of the settlers outback who rely on the monthly mail for supplies, are short of food.

At left: Communication and access difficult (3)

With the Lambina homestead lying in ruins, "headquarters" was moved to a new homestead on their adjoining Granite Downs lease. There were probably many more significant weather events "up north" during the years that my grandfather and my father bred horses and later cattle (when the Indian Army became mechanised) but the Flood of 1938 was the one most talked about.

Alberga starting to run in a previous flood - c 1935 (2)

Overland Telegraph Line inundated by sandstorm - c 1935 (2)

Aboriginal Stockmen at Granite Downs, 1940 (2)

Camel dray at Lambina Station, 1938 (2)

NO MORE REMOUNTS FOR INDIAN ARMY

£400,000 Annual Loss To Australian Trade

FREMANTLE, Wednesday. — The mechanisation of the Indian Army will mean a loss of £400,000 annually to the Australian remount business, said Mr. J. E. Robb, a South Australian remount dealer and horse breeder, who passed through Fremantle in the Narkunda.

He has been supplying the market in India for the past 40 years. He said that an average of 5,000 remounts were shipped annually, but following the change in cavalry, no more were wanted.

According to advice from Indian Army headquarters at Simla, no more remounts would be required for at least four years, and there would be no guarantee then that fresh horses would be needed.

However, there was still a good demand for polo ponies and horses needed for native State occasions.

Mr. Robb is the owner of Lambina Station, which is situated in the flooded country north of Oodnadatta. The station homestead has been wrecked by the floods, and the manager (Mr. Paige) and his family are now living in tents on sandhills standing above the water.

Virtual end of the horse trade, about 1938. (3)

Sources:

(1) “Jim Robb” book written by Jim’s daughter Maise Chettle (nee Robb), 1996

(2) Photographs from Robb family albums

(3) Newspaper clippings from “The News” and “The Mail” (Adelaide, 1938).

History and Weather Number 4 - Henry V in France

by Dianne Davis

You may remember that in earlier articles in this series, I discussed the significance of mud during the Battles of Waterloo and Passchendaele. In the Battle of Agincourt, rain and mud were again a determining factor in the outcome of the battle.

The Battle of Agincourt which occurred on 25th October 1415 - made famous by Shakespeare in his play *Henry V* - was part of the One Hundred Years' war which occurred between England and France and was fought intermittently between 1337 and 1453

Basically this war was about the English claim to territory in France and in 1415 Henry V decided to reassert what he saw as his long standing claim to the throne of France.

Figure 1 Henry V source Wikipedia

[The narrative of which royal person had promised what tract of land to which other royal person and when this occurred is much too complicated to discuss here, but detailed accounts of claim and counter claim by each side are given in the references at the end of this article.]

As mentioned, Henry V was convinced that he was the rightful king of France, so he invaded it on 11August 1415 with an army of nine thousand archers and three thousand men at arms. He landed near the port town of Harfleur. The town was under French control, but strategically it made sense for Henry to start his campaign there as it is located on the northern side of the mouth of the River Seine. Its possession would give him firstly a port to channel reinforcements through, and, secondly, was positioned so that he had many options for his next foray into French territory.

The siege of the town was begun by the English on 18 August and lasted 6 weeks until 22 September. This was much longer than Henry was anticipating. The unsanitary conditions in which the army fought with thousands of men, horses and other animals close together and no effective provision for the disposal of the waste they produced, meant that infections spread easily and dysentery was rife. English losses were severe - it is estimated that one third of Henry's army died at Harfleur. However in the end it was an English victory.

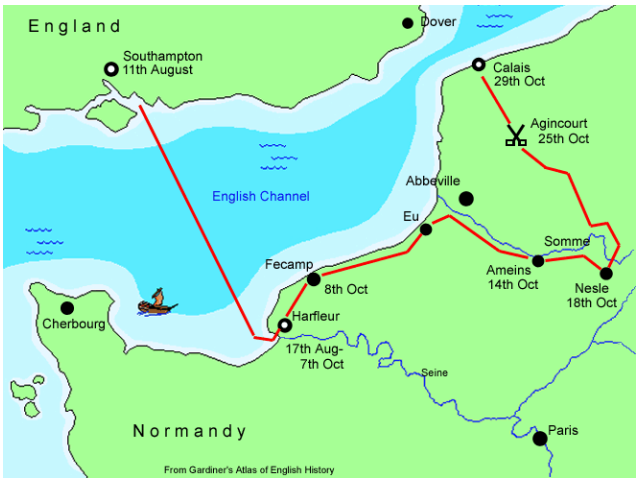


Figure 2 Campaign Map
Source:hacotesc2.wordpress.com/page/2/

Leaving a small force to control Harfleur, Henry intended to march directly back to Calais which at this stage was under the control of the English and then to return to England. However, he found that every crossing of the River Somme (which lies between Harfleur and Calais) was guarded by the French so that he was forced to go east rather than north.

Henry finally crossed the Somme south of Peronne on 18 October and resumed marching north. This delay allowed a large French force, led by the Constable and Marshall of France to intercept him near the village of Agincourt on 24 October. Battle was joined on 25 October (St Crispin's Day).

Contemporary estimates were that the English army consisted of about 6,000, while the French army probably consisted of 20,000 to 30,000 men. This suggests that the French could have outnumbered the English 5 to 1. However, at least one recent scholar puts

the French army at no more than 12,000[1], indicating that the English were outnumbered 2 to 1. Whatever the French numbers were, it seems clear that the English were at a decided numerical disadvantage. As well, the English were not in an ideal condition to fight a battle. They had been weakened by the siege at Harfleur, had marched over 320 km, and many among them were suffering from dysentery.

Normally the Medieval European fighting season was from spring to early autumn as after that it was considered to be too cold and too wet. However, the delays caused by the longer than expected siege of Harfleur and the lengthy English march to cross the Somme meant that the Battle of Agincourt was fought in late autumn. Very significantly the field on which the battle was fought had recently been deeply ploughed for winter crops and it was a sticky mess. Extremely heavy rain during the week before had made it even more glutinous.

The battlefront was approximately 730 metres wide with the opposing forces about 230 metres apart. It was framed by trees which favoured the English who were safe from attacks from the flanks. Henry had positioned his forces so that the majority of archers were on the side where they could do the most damage to the enemy

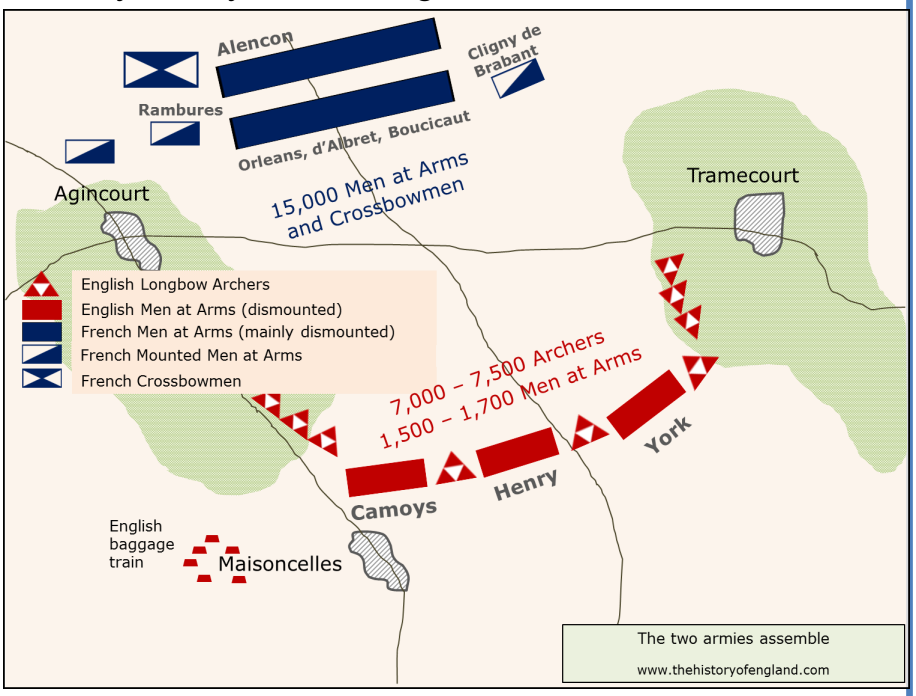


Figure 3 Map of the Agincourt Battlefield Source: History of England blog

The French had originally drawn up a battle plan that had archers and crossbowmen in front of their men-at-arms, with a cavalry force at the rear specifically designed to fall upon the English archers, and use their combined force to crush them. What actually happened was the French archers and crossbowmen were deployed behind and to the sides of their men-at-arms (where they seem to have played almost no part, except possibly for an initial volley of arrows at the start of the battle which had little effect).

The fighting commenced at 11 am, when the English fired their longbows at the French forces. A skilled longbow archer could fire 10 arrows per minute and each had a range of 240 metres (250 yards). So with 6,000 men firing ten arrows per minute, it meant that 1,000 arrows per second were being fired.

Figure 4 Medieval English Long Bowman Source: Quora

The French cavalry, despite being disorganised because they were not in their correct fighting configuration or at their full numbers, charged towards the long bowmen. It was a disastrous move. Because of the narrowing field and the encroaching woodland, the French knights were unable to outflank the long bowmen Henry had placed on the flanks of his army.

If the French cavalry had charged immediately after the first volley of arrows, they may well have devastated the English line. It is unclear whether the delay occurred because the French were hoping the English would launch a frontal assault (and were surprised when the English instead started shooting from their defensive side positions), or whether the French mounted knights did not react quickly enough to the English tactics

[1] See Encyclopaedia Britannica

As mentioned, the field that the French had to cross was a quagmire (the mud was knee deep) which slowed their progress. When the first French line reached the English front, the cavalry were unable to overpower it because of the sharpened, angled stakes driven in front of the archers - a fighting technique used for the first time by the English at this battle.

The second line of French knights that advanced towards the English was hindered by the dead horses and dead men from the first attack. Significantly they also found themselves so tightly packed together by the narrowing field that they were unable to use their weapons effectively. The tide of the battle began to turn toward the English. The third line of the French army, recoiling at the pile of corpses before them and unable to make an effective charge, was massacred. Many archers having used all their arrows, attacked the French forces with swords and axes taken from the French themselves.

Figure 5 Contemporary Illustration of the Battle Source: Wikipedia

The battle probably lasted no longer than three hours and was perhaps as short as half an hour, according to some estimates. While the precise number of casualties is unknown, it is estimated that English losses amounted to about 400 and French losses to at least 6,000 perhaps even 10,000, many of whom were noblemen.

Once more the weather had been instrumental in the defeat of an army.

With this outcome Henry V strengthened his position in his own kingdom and legitimised his claim to the crown, which had been under threat after his accession. Most importantly, the battle was a significant military blow to France and paved the way for further English conquests and successes.

Ultimately the Battle of Agincourt was in vain. Henry V died of battlefield dysentery in another campaign in France in 1422 and his son Henry VI succeeded to the English throne at the age of only 9 months. He grew to be a studious man but an ineffective king and it is thought he suffered from catatonic schizophrenia. This, plus the Wars of the Roses from 1455 to 1487, meant that England was in no position to continue their claim to the French throne and they lost all their land in France except for Calais. Eventually as part of the Treaty of Troyes in1564, Elizabeth I recognised French ownership of Calais in return for 120,000 crowns.

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History.COM Editors for a Full account of Henry V's life and achievements

https://www.history.com/topics/british-history/henry-v-england

Simple Explanation of the topic https://www.futurelearn.com/info/courses/agincourt/0/steps/8857, https://www.futurelearn.com/info/courses/agincourt/0/steps/8858

Map and timeline of Events The road to Agincourt

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The Guardian Newspaper the French View of the Battle AGAIN

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History Today Nine things you may not know about the Battle of Agincourt

https://www.history.com/news/9-things-you-may-not-know-about-the-battle-of-agincourt

Standardising daily rainfall totals at Cumberland Park by Jon Lethbridge

My backyard gauge setup at Cumberland Park was first introduced to members during a joint presentation with President Mark Little about home-based Rain Measurement methods. See Monana April 2019 for more details.

My setup for recording the rain is shown below in Figure 1. In the left hand photo, from the left we have :

- A NETA Manual Gauge , which acts as a physical back up. The other gauges are electronic and can fail . (the batteries need changing every four months or so)
- A Lennox Tipping Bucket collecting 1 mm per tip
- A Nylex Tipping Bucket collecting 0.25 mm per tip

The righthand image shows the Nylex tipping bucket rain gauge with the collection funnel removed. The tipping bucket mechanism is shown in the middle of the device.

Figure 1. Jon's Rain recording Equipment.

Readings from the Lennox and Nylex buckets are displayed on control centres located inside the house. (see Figure 2 below). At the moment the Lennox Bucket System is not Functioning, but the clock Works, so I can use this to confirm my time calculations .

Figure 2: Control centres (Nylex on left, Lennox on right)

The daily totals from the Nylex sometimes bothered me as they did not always agree that well with daily rainfall reported by the Bureau.

It suddenly dawned on me - the Nylex gauge is pre-set to record daily rainfall for the 24 hour period midnight to midnight – whereas the Bureau records the daily rainfall for the 24 hour period 9.00am to 9.00am.

I realised I needed to adjust the Nylex to give daily readings that are recorded at 9 am, (the BOM Standard). Unfortunately I could not see how the pre-set midnight recording time could be changed so I decided to adjust the time setting through trial and error using the Nylex Offset Hours facility. Perhaps someone more familiar with the device may be aware of an easier method.

By moving the clock forward 15 hours, midnight on the control centre occurs at 9am local time – the pre-set time for 24 hour rainfall to be totalled to give the daily rainfall. These totals are then directly comparable to the 9.00am daily totals recorded at Bureau of Meteorology rainfall stations.

To confirm my calculations I compared the readings on the control centres. Figure 2 shows that 7.25 am on the Nylex occurs at 4.25 pm. Within a couple of minutes of the Lennox display.

I then compared my new readings with data from the nearby Keswick Gauge (Number 023115) to compare recent daily totals. Success!

Comparisons can now be seen in Figure 3 below, with my readings given as a variation from the Keswick Readings.

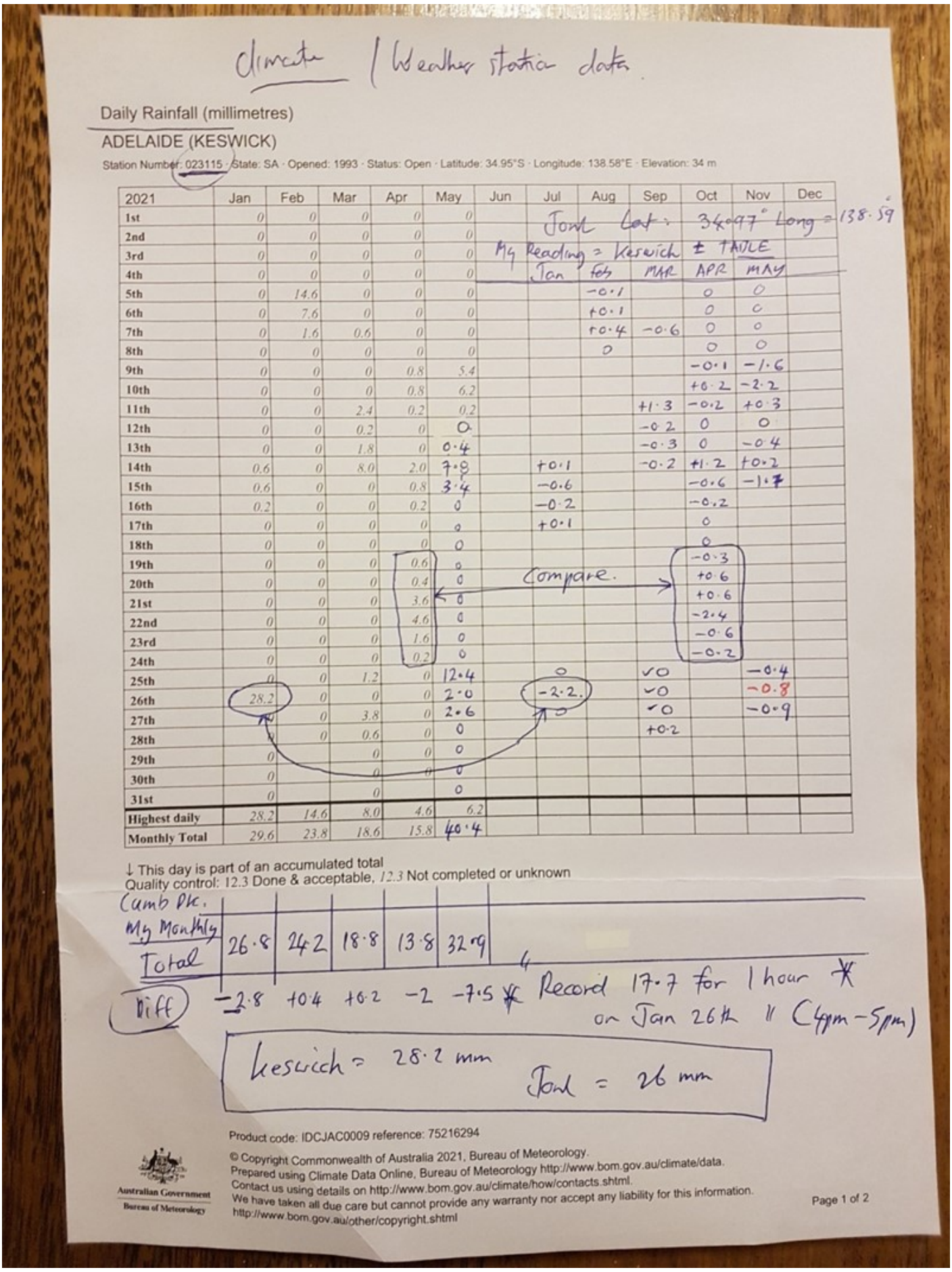
For Example Jan 26th, Keswick recorded 28.2 mm, where I recorded -2.2 mm less at 26mm. On Mar 27th I had the same reading hence 0 in my cell.

For my two years of hourly rain data I now plan adjust the 24 hour aggregate periods, using Excel , to get the 9am – 9am daily totals as per the BOM Standard .Then I hope to do a more comprehensive comparison with the data from Keswick Station. This data can be found at Climate Data Online and in “3. Get the data” part of the form, enter 023115 in the “Station number” field.

Keswick is the closest official rainfall site to my station which reliably records daily rainfall 7 days a week. Clarence Gardens Bowling Club Station No. 023093 is closer to my address but unfortunately the Gauge isn’t read every day.

Conclusion: it’s been fun getting my gauge to measure the rain. I have followed the synoptics as well, so I can correlate rainfall with the weather systems around. Rain is associated with Low Pressure Cells, Troughs and the tried and true Cold Fronts

I wish also to Highlight the record reading I got on January 26th 2021 ***of a whopping 17.7 mm in one hour between 4 and 5 pm.***



climate / Weather station data

Daily Rainfall (millimetres)

ADELAIDE (KESWICK)

Station Number: 023115 · State: SA · Opened: 1993 · Status: Open · Latitude: 34.95°S · Longitude: 138.58°E · Elevation: 34 m

Ford Lat: 34.97° Long = 138.59

My Reading = Keswick ± TABLE

2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	0							
2nd	0	0	0	0	0							
3rd	0	0	0	0	0							
4th	0	0	0	0	0							
5th	0	14.6	0	0	0							
6th	0	7.6	0	0	0							
7th	0	1.6	0.6	0	0							
8th	0	0	0	0	0							
9th	0	0	0	0.8	5.4							
10th	0	0	0	0.8	6.2							
11th	0	0	2.4	0.2	0.2							
12th	0	0	0.2	0	0							
13th	0	0	1.8	0	0.4							
14th	0.6	0	8.0	2.0	7.8							
15th	0.6	0	0	0.8	3.4							
16th	0.2	0	0	0.2	0							
17th	0	0	0	0	0							
18th	0	0	0	0	0							
19th	0	0	0	0.6	0							
20th	0	0	0	0.4	0							
21st	0	0	0	3.6	0							
22nd	0	0	0	4.6	0							
23rd	0	0	0	1.6	0							
24th	0	0	0	0.2	0							
25th	0	0	1.2	0	12.4							
26th	28.2	0	0	0	2.0							
27th	0	0	3.8	0	2.6							
28th	0	0	0.6	0	0							
29th	0		0	0	0							
30th	0		0	0	0							
31st	0		0		0							
Highest daily	28.2	14.6	8.0	4.6	6.2							
Monthly Total	29.6	23.8	18.6	15.8	40.4							

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
								Feb	MAR	APR	MAY	
								-0.1		0	0	
								+0.1		0	0	
								+0.4	-0.6	0	0	
								0		0	0	
										-0.1	-1.6	
										+0.2	-2.2	
									+1.3	-0.2	+0.3	
									-0.2	0	0	
									-0.3	0	-0.4	
							+0.1		-0.2	+1.2	+0.2	
							-0.6			-0.6	-1.7	
							-0.2			-0.2		
							+0.1			0		
										0		
										-0.3		
										+0.6		
										+0.6		
										-2.4		
										-0.6		
										-0.2		
							0		✓0		-0.4	
							-2.2.		✓0		-0.8	
							0		✓0		-0.9	
									+0.2			

Compare.

↓ This day is part of an accumulated total

Quality control: 12.3 Done & acceptable, *12.3* Not completed or unknown

	Jan	Feb	Mar	Apr	May
Camb Pk. My Monthly Total	26.8	24.2	18.8	13.8	32.9
Diff	-2.8	+0.4	+0.2	-2	-7.5 *

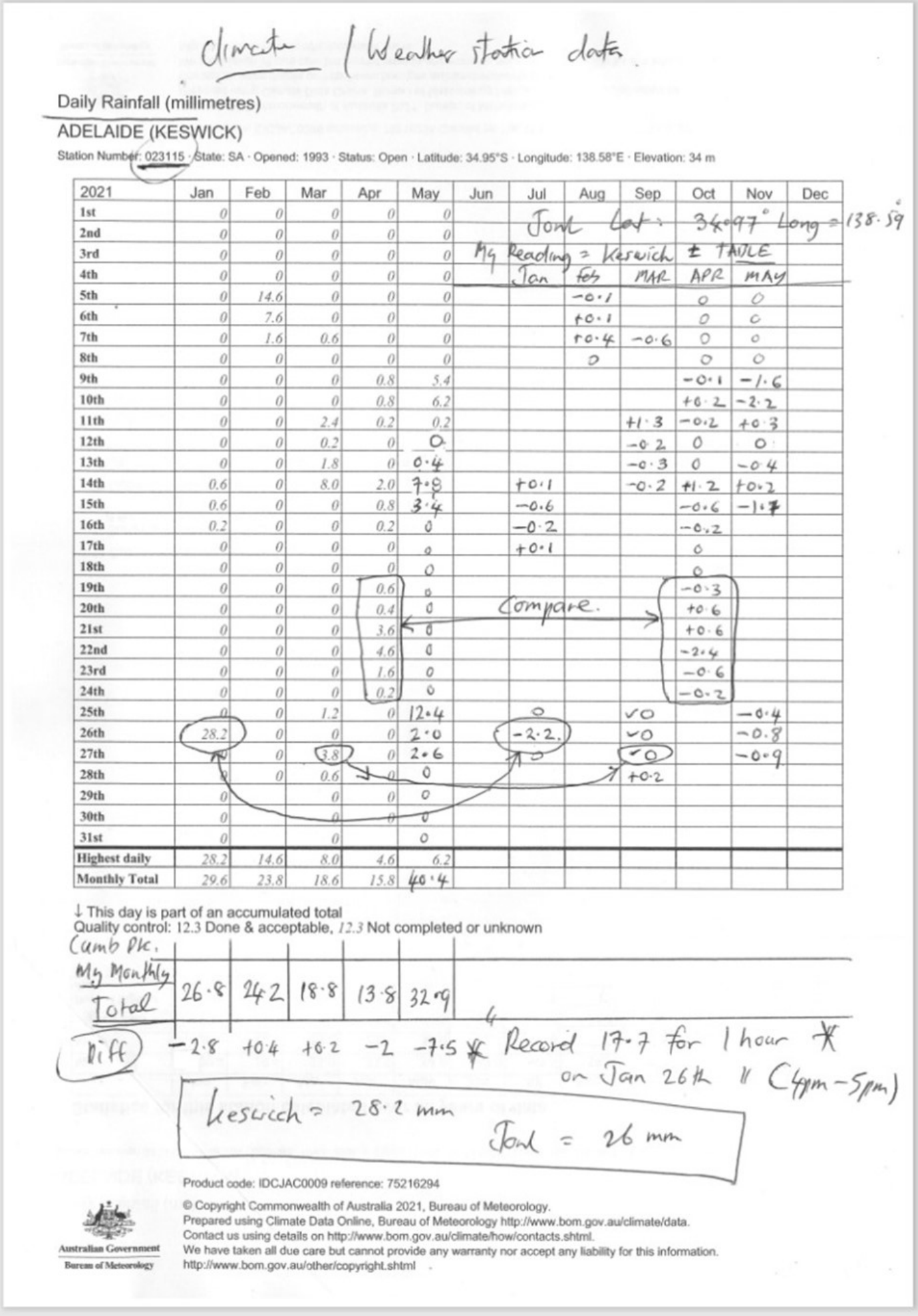
Record 17.7 for 1 hour * on Jan 26th ‖ (4pm-5pm)

Keswick = 28.2 mm Ford = 26 mm

Product code: IDCJAC0009 reference: 75216294

Australian Government Bureau of Meteorology

Figure 3A. Keswick Gauge Comparison



climate / Weather station data

Daily Rainfall (millimetres)

ADELAIDE (KESWICK)

Station Number: 023115 · State: SA · Opened: 1993 · Status: Open · Latitude: 34.95°S · Longitude: 138.58°E · Elevation: 34 m

2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	0		Jond Lat = 34.97° Long = 138.59					
2nd	0	0	0	0	0							
3rd	0	0	0	0	0		My Reading = Keswick ± TABLE					
4th	0	0	0	0	0		Jan	Feb	MAR	APR	MAY	
5th	0	14.6	0	0	0			-0.1		0	0	
6th	0	7.6	0	0	0			+0.1		0	0	
7th	0	1.6	0.6	0	0			+0.4	-0.6	0	0	
8th	0	0	0	0	0			0		0	0	
9th	0	0	0	0.8	5.4					-0.1	-1.6	
10th	0	0	0	0.8	6.2					+0.2	-2.2	
11th	0	0	2.4	0.2	0.2				+1.3	-0.2	+0.3	
12th	0	0	0.2	0	0				-0.2	0	0	
13th	0	0	1.8	0	0.4				-0.3	0	-0.4	
14th	0.6	0	8.0	2.0	7.8		+0.1		-0.2	+1.2	+0.2	
15th	0.6	0	0	0.8	3.4		-0.6			-0.6	-1.7	
16th	0.2	0	0	0.2	0		-0.2			-0.2		
17th	0	0	0	0	0		+0.1			0		
18th	0	0	0	0	0					0		
19th	0	0	0	0.6	0					-0.3		
20th	0	0	0	0.4	0		Compare.			+0.6		
21st	0	0	0	3.6	0					+0.6		
22nd	0	0	0	4.6	0					-2.4		
23rd	0	0	0	1.6	0					-0.6		
24th	0	0	0	0.2	0					-0.2		
25th	0	0	1.2	0	12.4		0		✓0		-0.4	
26th	28.2	0	0	0	2.0		-2.2.		✓0		-0.8	
27th	0	0	3.8	0	2.6		0		✓0		-0.9	
28th	0	0	0.6	0	0				+0.2			
29th	0		0	0	0							
30th	0		0	0	0							
31st	0		0		0							
Highest daily	28.2	14.6	8.0	4.6	6.2							
Monthly Total	29.6	23.8	18.6	15.8	40.4							

↓ This day is part of an accumulated total

Quality control: 12.3 Done & acceptable, *12.3* Not completed or unknown

Cumb Pk.

My Monthly Total	26.8	24.2	18.8	13.8	32.9
Diff	-2.8	+0.4	+0.2	-2	-7.5

* Record 17.7 for 1 hour on Jan 26th ~ (4pm-5pm)

Keswick = 28.2 mm

Jond = 26 mm

Product code: IDCJAC0009 reference: 75216294

Australian Government
Bureau of Meteorology

Figure 3B. Keswick Gauge Comparison

Jet Streams - Weapons of War? by Bruce Davis

We are probably all familiar with the term “Jet Stream” as it is often mentioned in items such as TV weather reports, but I wonder how many are aware of their part in World War 2.

A jet stream is defined by the Bureau of Meteorology as “A flat, tubular current of air located in the tropopause, the area in the Earth's atmosphere located between the troposphere and the stratosphere. These powerful winds are generated by strong pressure gradients which reflect the great temperature differences at high altitudes.” They occur at breaks or folds in the tropopause where differences in adjacent tropopause heights lead to strong horizontal temperature and hence pressure gradients (see figure 1); and have a general westerly direction.

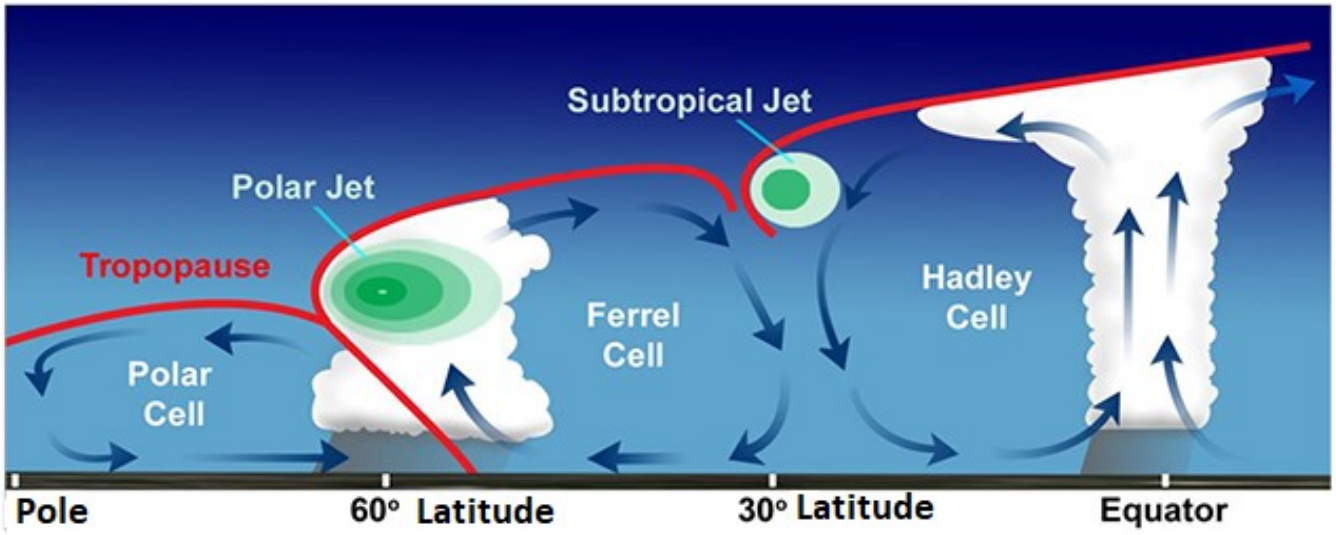


Figure 1: Atmosphere Cross Section by latitude Source: Wikipedia

Two common jet streams are frequently encountered over the Australian region. These are the Polar Front Jet at about 30000 ft (300 hpa) and the Sub Tropical jet at about 38000 ft (200 hpa). These are shown on figure 2 as the solid black lines at altitudes of about 30000 ft and 39000 ft respectively, with forecast speeds from 100 kts (about 185 km/hr) to 300 kts. These altitudes are used by airliners and so jet streams can have a significant effect upon ground speeds. Many of you may have heard of or experienced shortened flight times when flying west to east or increased flight times when flying east to west. Of course the direction of the jet stream although generally westerly can be otherwise as indicated in figure 2. (Figure 2 is an upper level forecast. These can be found at http://www.bom.gov.au/aviation/charts/sigwx/#).

Jet streams also have another significant effect on aviation as the windshear associated with the rapid change in windspeed around the jet stream core gives rise to Clear Air Turbulence. (CAT). This turbulence can be very severe and, as the name suggests, occurs in what outwardly appears to be calm air. Areas of Forecast CAT are shown by the dashed lines on figure 2. CAT is one of the few meteorological hazards that affect high flying aeroplanes, as the majority of hazardous weather occurs at lower levels in the troposphere.

The first recorded possibility of jet stream existence occurred after the Krakatoa volcanic eruption in 1883. Observers speculated that a rapid current in the upper atmosphere was carrying the dust from the eruption eastward around the equator.

The first official detection of jet streams was made by Japanese meteorologist Wasaburo OishiIn, the director of Japan’s Tateno atmospheric observatory, in the 1920s. OishiIn tracked balloons as they rose into the atmosphere from a site near Mount Fuji. Between 1923 and 1925 he made almost 1,300 observations of fierce high-altitude winds. Co-

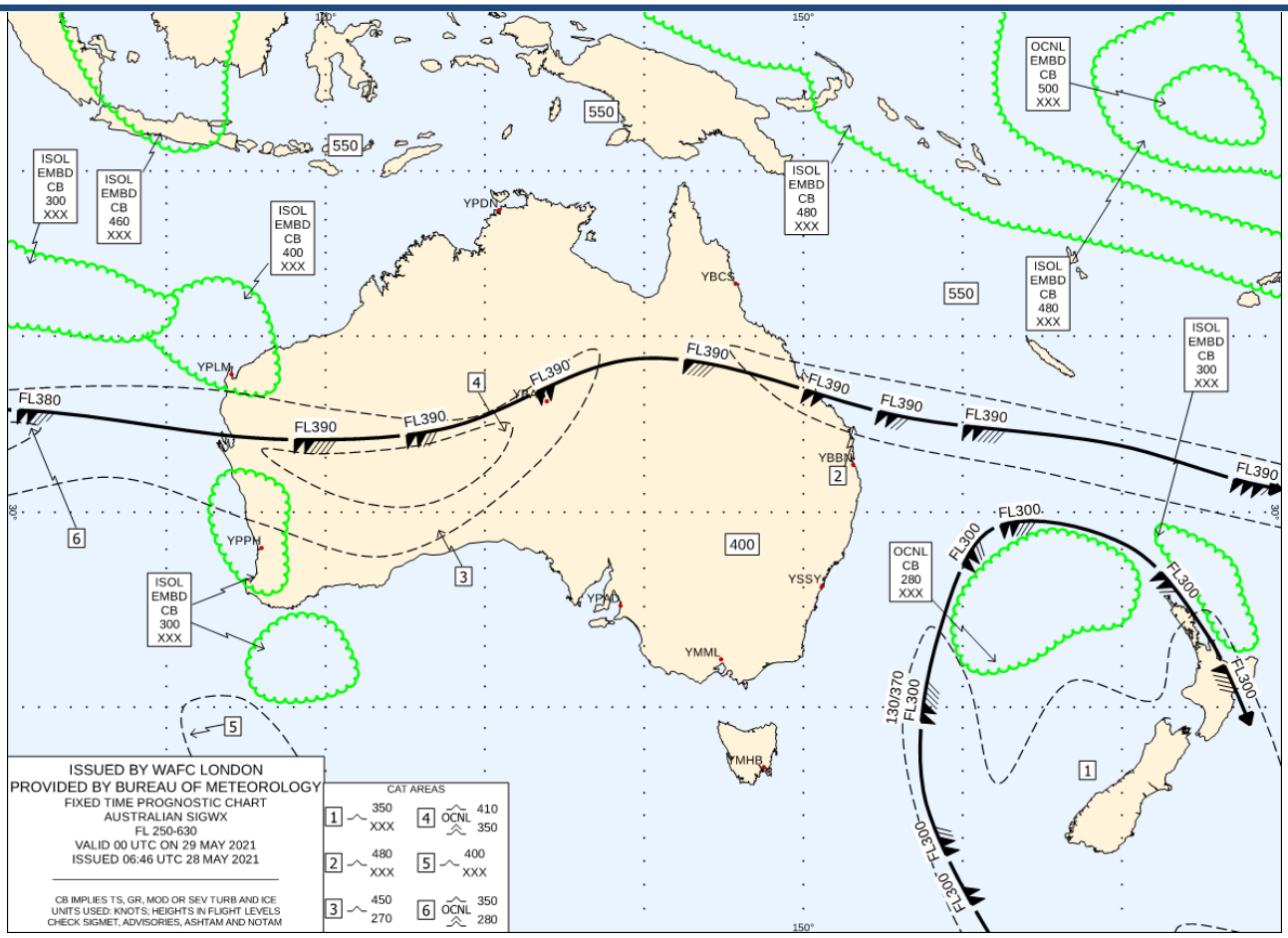


Figure 2: Upper Level Forecast (25000 to 63000 ft) Thick black lines indicate Jet Streams Source: BOM

incidentally, jet streams over Japan tend to be stronger than elsewhere. Unfortunately his work went largely unnoticed outside of Japan, partly because it was published in Esperanto (Ooishi was head of the Japan Esperanto Society).

The next person credited with involvement in jet stream discovery is American pilot Wiley Post, the first man to fly solo around the world (1933). He had invented a pressurized suit that enabled him to fly above 20,000 ft. In1934 he made several attempts at a high-altitude transcontinental flight reaching 40000 ft at one time. During these flights he noticed that at times his ground speed greatly exceeded his air speed.

Strong winds in the upper troposphere were measured regularly in the 1930's by early versions of radiosonde balloons but it was in World War 2 that the existence and significance of jet streams became widely known. It was at this time that aeroplanes were able to fly at jet stream altitudes.

Allied pilots consistently noticed westerly tailwinds in excess of 100 kts in flights from the US to the UK. In 1943 a flight of English bombers ran out of fuel over occupied France flying into a headwind of 104 kts. German reconnaissance aircraft reported strong westerly winds at high altitude over the Mediterranean. In January 1945 Allied bombers flying eastward at 25000 ft over Germany encountered tailwinds of 130 kts. With a groundspeed of 230 kts they reached their target early. On their westward return, their ground speed dropped to as low as 50 kts. Another group met headwinds of 105 kts in March 1945 at the same height, and the consequent slow ground speed made them an easy target for anti-aircraft fire.

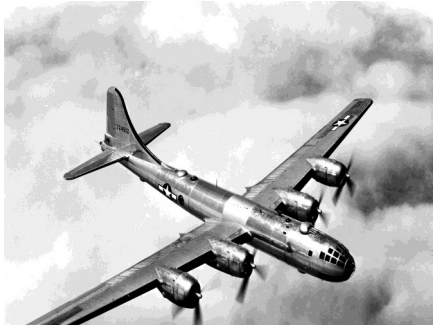


Figure 3: Boeing B-29 Super-Fortress Source: Wikipedia

The introduction of the Boeing B-29 (Figure 3) in 1944 enabled consistent high altitude bombing of Japan. The strong westerly jet streams over Japan played havoc with the raids.

Bombs dropped from cruising altitudes missed targets. Bombers flying west towards Japan used far more fuel than expected. In some cases they ran out of fuel on the return trip. Air force meteorologists were assigned to prepare wind forecasts for aircraft operations at such altitudes. One such forecast predicted a 168 knot wind blowing from the west. The general who ordered the forecast called the meteorologists stupid as surely they meant 68 knots. So the forecast was ignored. The winds were measured in flight at 170 kt. The general apologized.

However, one of the most intriguing and bizarre uses of jet streams in World War 2 was the Japanese balloon bombing of the west coast of the United states.

Figure 4: Japanese "Fu -Go" Balloon Source: Wikipedia

In mid-1944 the bombing of Japanese cities began in earnest. The Japanese military found it almost impossible to combat these air raids and a desire to retaliate in some way arose. At the time Japan had very little (if any) ability to attack US cities. However, as mentioned above, Japanese meteorologists were aware of the presence of jet streams and, co-incidentally, the strongest currents tend to be found over Japan in winter. Therefore the idea arose of using explosive fitted balloons to ride the jet streams to continental North America.

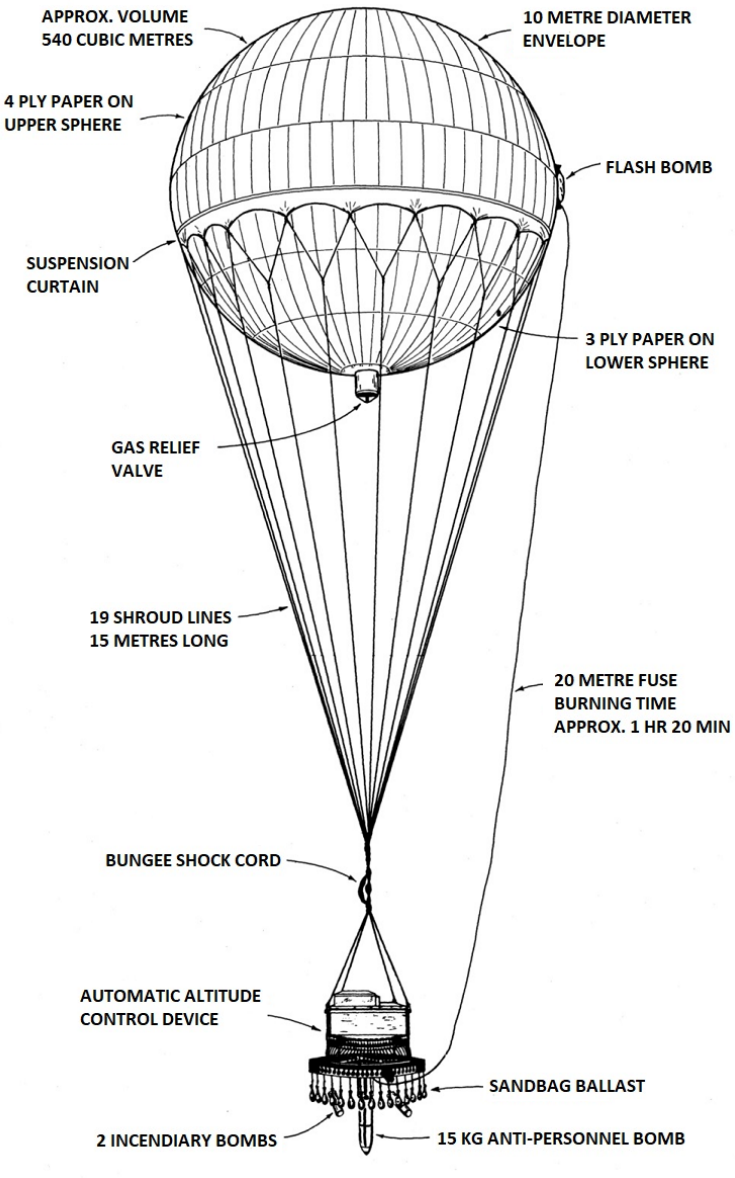


Figure 5: 'Fu-Go" Balloon Bomb Components Source: Missouri University of Science and Technology

Cosequently the Fu-Go balloon bomb was developed with the first balloons launched from the Japanese mainland in November 1944.These were 10 metre diameter hydrogen filled balloons made of "washi", a paper derived from mulberry bushes that was impermeable and very tough. It was only available in squares about the size of a road map and so was glued together in three or four laminations. Each carried a 12 kg incendiary or 15 kg high-explosive bomb, plus four 5 kg incendiaries (see figures 4 and 5) and was designed to climb to jet stream altitudes. To allow for expansion due to the sun's heat by day and contraction by night, plus weight increase due to things such as dew, the balloons were equipped with altimeter controlled devices to vent hydrogen when they rose above 38000 ft and jettison ballast when they fell below 30000 ft. Japanese scientists calculated that it would take about 3 days to reach North America from Japan so the ballast was designed to last for this long. When all the ballast had been dropped, the balloons would hang in the air over the United States. Gunpowder then released the bombs and lit a long fuse that, after 84 minutes, fired a flash bomb aimed at destroying the balloon in an attempt to

keep the program secret.

The incendiary bombs were designed to light forest fires and the explosive bombs to cause damage to structures plus possible injury and death. As can be guessed, it was not exactly precision bombing and Japanese officials estimated that only 10 percent would complete the journey, but they hoped that this would be sufficient to destroy buildings or set off fires, and incite terror among the American population.

The first balloon was launched on November 3, 1944. Between then and April 1945, over 9,300 were launched and it is estimated about 1,000 of them reached North America. Of these 284 are documented as sighted or found (see fig 6), many as fragments. Damage was minimal due to the low numbers reaching land, winter rains soaking the forests and rain or the fire department quickly extinguishing any fires that broke out.

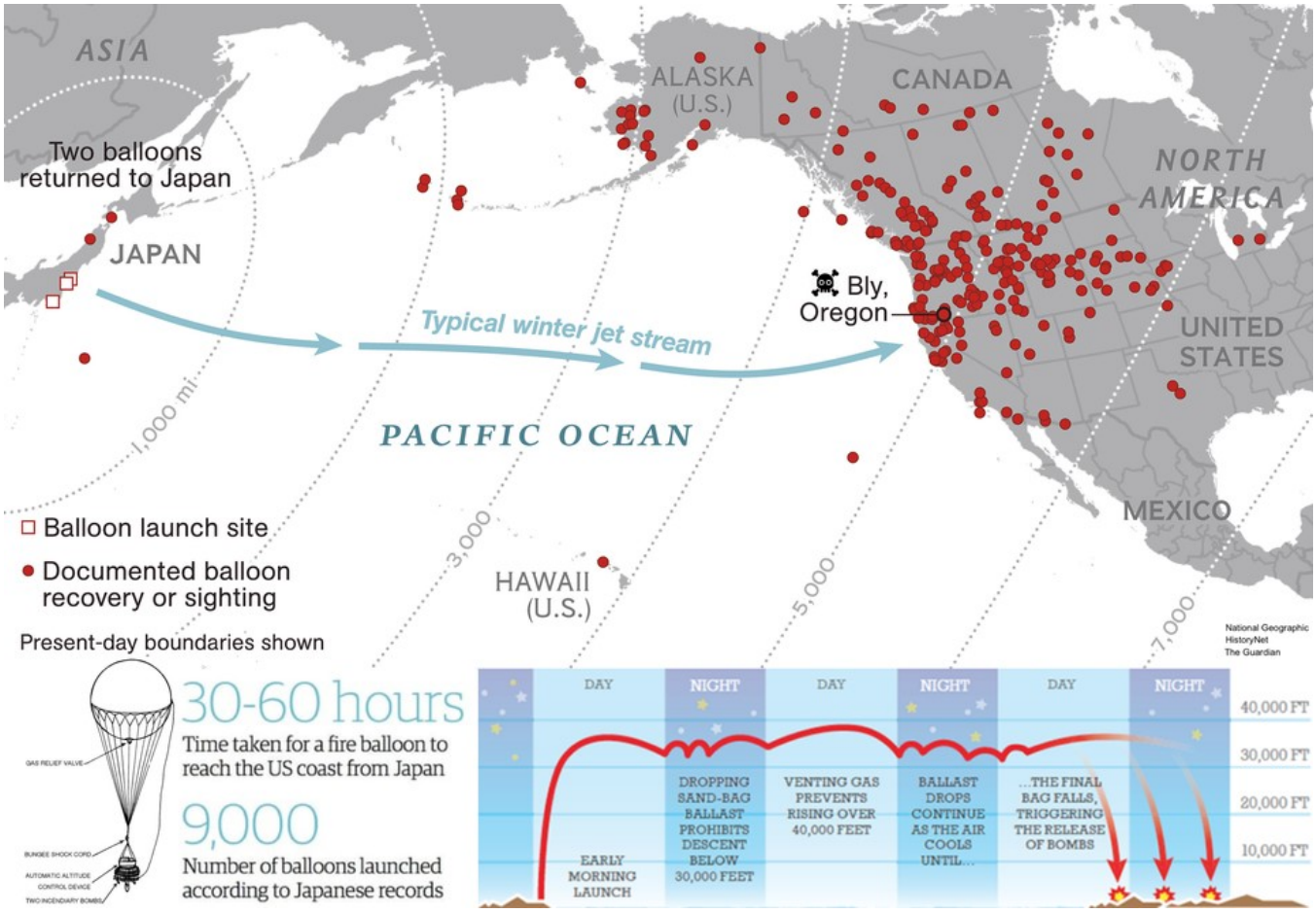


Figure 6: Known sightings of balloons. **Source Reddit**

The only casualties occurred on May 5, 1945 near Bly, Oregon, a month after the program had been suspended. Five children and the local pastor's pregnant wife were killed as they played with a large paper balloon they'd spotted during a Sunday outing in the woods. The balloon had landed rather than self-destruct and had lain dormant until found by the children.

The only other incident of note was in March 1945 when a balloon damaged a high tension power line to the Hanford, Washington, nuclear facility. This was producing plutonium for the atomic bomb that five months later destroyed Nagasaki. Work was briefly interrupted.

Nevertheless, despite the lack of success the bombs still worried US authorities. Some had been intercepted, some had been found and some had been seen floating in the air. The source was traced back to Japan. To try and avoid panic the US authorities forbade and discouraged stories about the balloon bombs (although many had been previously published). They were also concerned that the Japanese would use these devices for

biological warfare on the US as it was known the Japanese were conducting biological warfare experiments. Fortunately Emperor Hirohito banned the use of such weapons so this planned use never eventuated.

One side effect of this secrecy was that news of the effects (or lack) of this bombing never reached Japan so they had no idea about the effect of the campaign.

The ban on reporting was lifted after the May 1945 explosion to prevent further loss of life.

With no evidence to/for Japan of any effect, the program was abandoned in April 1945. The Japanese believed that the mission had been an expensive fiasco. Around the same time B-29s destroyed two of the three hydrogen plants needed by the project so its viability would have been in question anyway.

Thus ended one of the first attempts to make use of jet streams.

However, it was not the end of the story. Fu-Go balloon bombs have continued to be found in the years since the end of the war. The most recent was in 2014 near Lumby, British Columbia. Who knows, maybe more are still waiting to be found.

Exercise caution if hiking in the woods of western North America!I

Greater Adelaide in autumn 2021: drier than average

Rainfall in autumn was below to very much below average across all sites in Adelaide and the Hills. Averaged across Greater Adelaide as a whole, it was the driest autumn since 2005. Daytime temperatures were generally warmer than average, while night-time temperatures were close to or cooler than average.

For more information plus a summary of Autumn's statistics please see:
http://www.bom.gov.au/climate/current/season/sa/archive/202105.adelaide.shtml

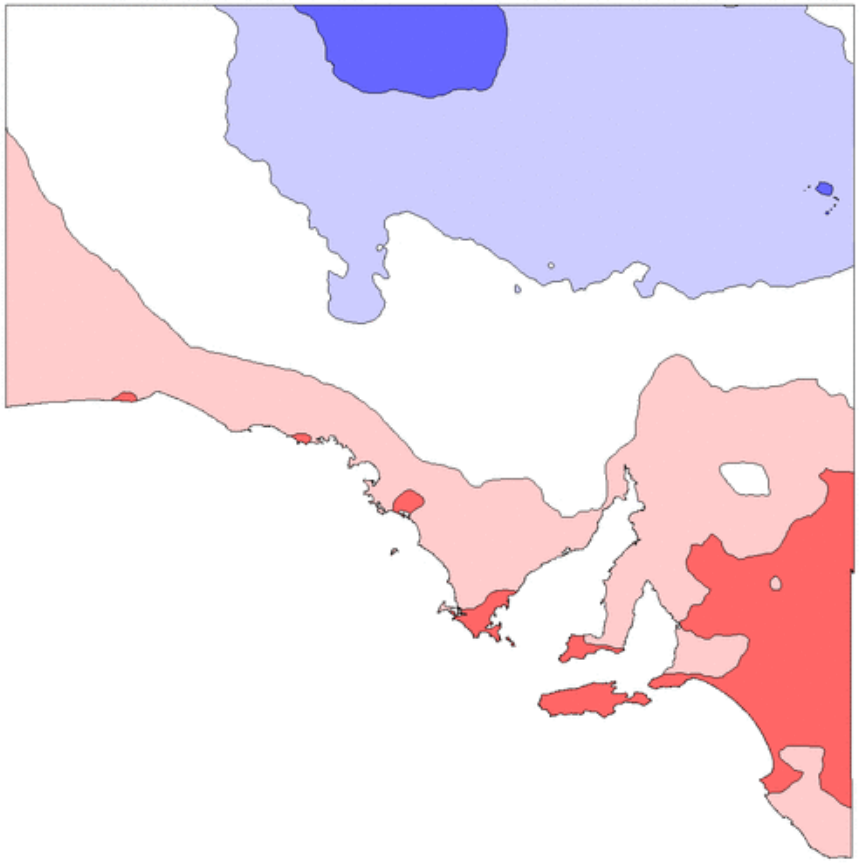
South Australia in autumn 2021: dry in the south, cold nights to end the season

Rainfall in autumn was very much below average in the eastern Agricultural districts and below average across most of the rest of the southern parts of the state. Warm daytime temperatures were experienced across many Agricultural districts, but were close to or cooler than average in the northern Pastoral districts. Night-time temperatures were below to very much below average in the east and far north of the state, but generally close to average elsewhere.

For more information plus a summary of Autumn's statistics please see:
http://www.bom.gov.au/climate/current/season/sa/archive/202105.summary.shtml

South Australian rainfall deciles 1 March to 31 May 2021

Australian Gridded Climate Data



Rainfall decile ranges

	Highest on record
10	Very much above average
8-9	Above average
4-7	Average
2-3	Below average
1	Very much below average
	Lowest on record

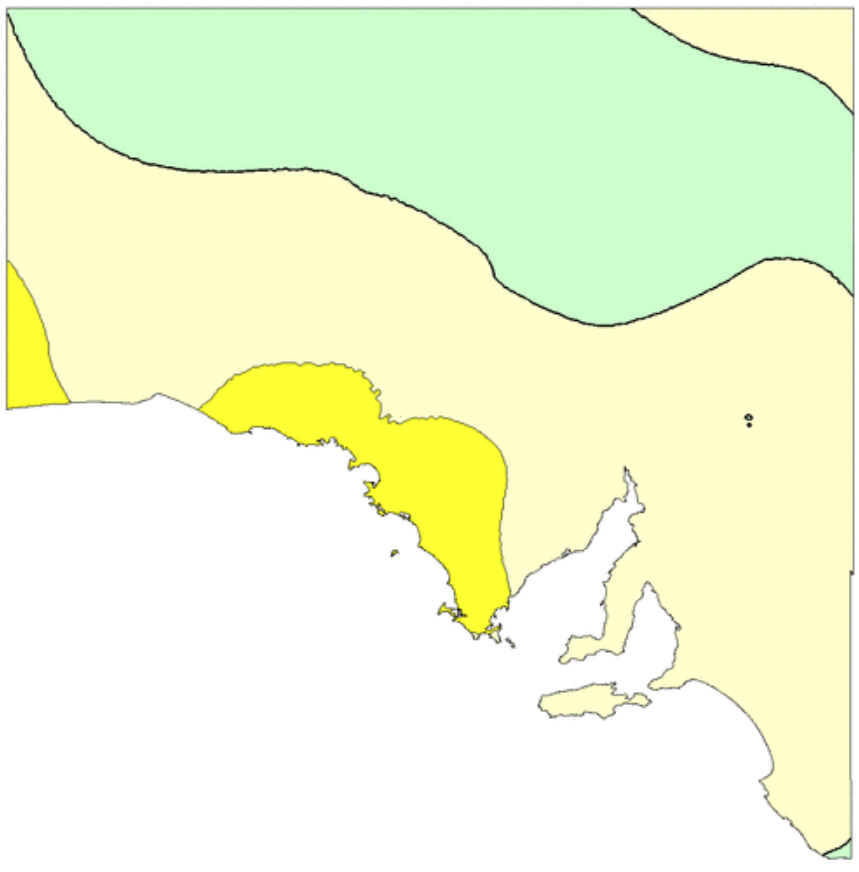
Base period: 1900—May 2021

Dataset: AGCD v2

Issued: 31/05/2021

Maximum Temperature Anomaly (°C) 1 March to 31 May 2021

Australian Bureau of Meteorology



6°C
5°C
4°C
3°C
2°C
1°C
0°C
-1°C
-2°C
-3°C
-4°C
-5°C
-6°C

http://www.bom.gov.au

 ID code: AWAP

Issued: 03/06/2021

Adelaide (West Terrace / Ngayirdapira), South Australia
April 2021 Daily Weather Observations

The official site for Adelaide, having reopened in May 2017.

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Th	13.9	32.3	0			E	22	22:43	20.8	40		NNE	6	1022.8	30.8	14		WSW	9	1021.1
2	Fr	15.4	33.4	0			WSW	24	14:27	21.0	42			Calm	1023.8	32.7	14		WSW	15	1020.4
3	Sa	17.3	33.7	0			NW	26	11:24	24.1	31		NE	13	1020.9	33.3	15		W	15	1018.1
4	Su	15.8	29.9	0			WSW	24	14:47	25.5	32			Calm	1019.6	28.5	31		SW	15	1017.7
5	Mo	12.9	25.7	0			SW	26	14:42	20.0	58		SSE	4	1022.0	24.7	43		WSW	15	1019.5
6	Tu	11.1	28.3	0			W	28	14:14	20.3	49		SW	2	1022.0	26.8	30		WSW	13	1018.7
7	We	11.4		0						20.5	48			Calm	1018.9	24.9	44		WSW	15	1015.0
8	Th	13.0	32.5				WSW	33	15:37	21.9	31		NE	7	1010.7	32.4	17		WNW	11	1006.6
9	Fr	14.2	22.4	0.6			SW	39	14:27	17.3	55		S	11	1014.3	20.1	44		SW	22	1012.1
10	Sa	14.0	19.6	0.6			SSW	50	17:39	16.3	65		S	17	1015.8	18.6	41		SSW	24	1016.3
11	Su	12.0	19.3	0.8			S	35	10:20	15.6	49		S	15	1023.9	16.8	48		S	17	1023.7
12	Mo	7.8	21.4	0			NNE	33	23:47	14.3	55		NNE	9	1024.9	21.0	30		NNE	13	1019.4
13	Tu	14.3	23.5	0			NNW	46	13:03	18.9	29		NNE	20	1012.3	22.4	24		N	19	1008.8
14	We	15.3	21.0	1.2			W	43	12:35	18.1	66		WSW	17	1017.2	19.7	42		SW	24	1017.1
15	Th	13.7	20.6	3.2			WSW	33	08:59	17.2	70		WSW	17	1020.6	19.5	58		WSW	17	1019.7
16	Fr	9.0	20.1	0			WSW	26	15:56	15.9	73		NNE	7	1026.2	19.4	58		WSW	13	1024.5
17	Sa	10.2	19.6	0			WNW	30	12:14	15.8	57		SSW	9	1029.1	18.5	47		SW	15	1026.8
18	Su	13.8	20.2	0			NW	20	11:37	14.9	82		NNE	9	1026.4	18.6	55		SSE	9	1023.3
19	Mo	12.2	20.5	1.2			NNW	30	16:10	13.5	87		ENE	15	1020.0	20.2	45		WNW	17	1015.8
20	Tu	11.0	18.4	0.2			SSW	37	13:27	14.4	80		N	9	1014.1	16.1	51		SSW	17	1016.6
21	We	6.4	17.1	2.8			W	30	23:02	10.1	66		N	11	1021.1	15.8	47		W	13	1017.6
22	Th	10.1	19.4	2.2			SW	37	12:28	15.4	78		SW	6	1018.1	17.8	51		SW	17	1017.7
23	Fr	12.8	18.7	4.0			SW	24	10:56	15.8	80		SE	6	1022.2	18.4	53		WSW	11	1021.4
24	Sa	11.9	20.0	0			SW	24	12:40	14.7	77		N	9	1026.9	18.8	57		WSW	13	1025.3
25	Su	8.6	20.2	0			WSW	24	13:01	16.0	68		N	6	1029.0	19.0	59		SW	15	1027.3
26	Mo	7.9	20.5	0			WSW	22	14:03	15.4	72		NE	4	1029.1	19.8	53		SW	11	1026.8
27	Tu	8.3	21.2	0			SW	20	16:05	15.8	62		ENE	6	1028.0	20.7	49		N	2	1024.6
28	We	8.2	20.7	0			WSW	28	13:06	15.4	72			Calm	1025.9	20.0	63		SW	15	1023.4
29	Th	8.0	22.7	0			WSW	20	13:31	15.6	61			Calm	1024.9	21.2	44		WSW	13	1022.0
30	Fr	9.6	26.8	0			ENE	28	07:11	19.8	40		NE	11	1023.3	26.2	21		W	9	1020.1
Statistics for April 2021																					
Mean		11.7	23.1							17.3	59			8	1021.8	22.1	41			14	1019.6
Lowest		6.4	17.1							10.1	29			Calm	1010.7	15.8	14		N	2	1006.6
Highest		17.3	33.7	4.0			SSW	50		25.5	87		NNE	20	1029.1	33.3	63		#	24	1027.3
Total				16.8																	

Observations were drawn from Adelaide (West Terrace / Ngayirdapira) {station 023000}
This is the "official" site for Adelaide, having reopened in May 2017. Observations are available from the Kent Town site {station number 023090} up until 31 July 2020.

Adelaide in April 2021: drier than average

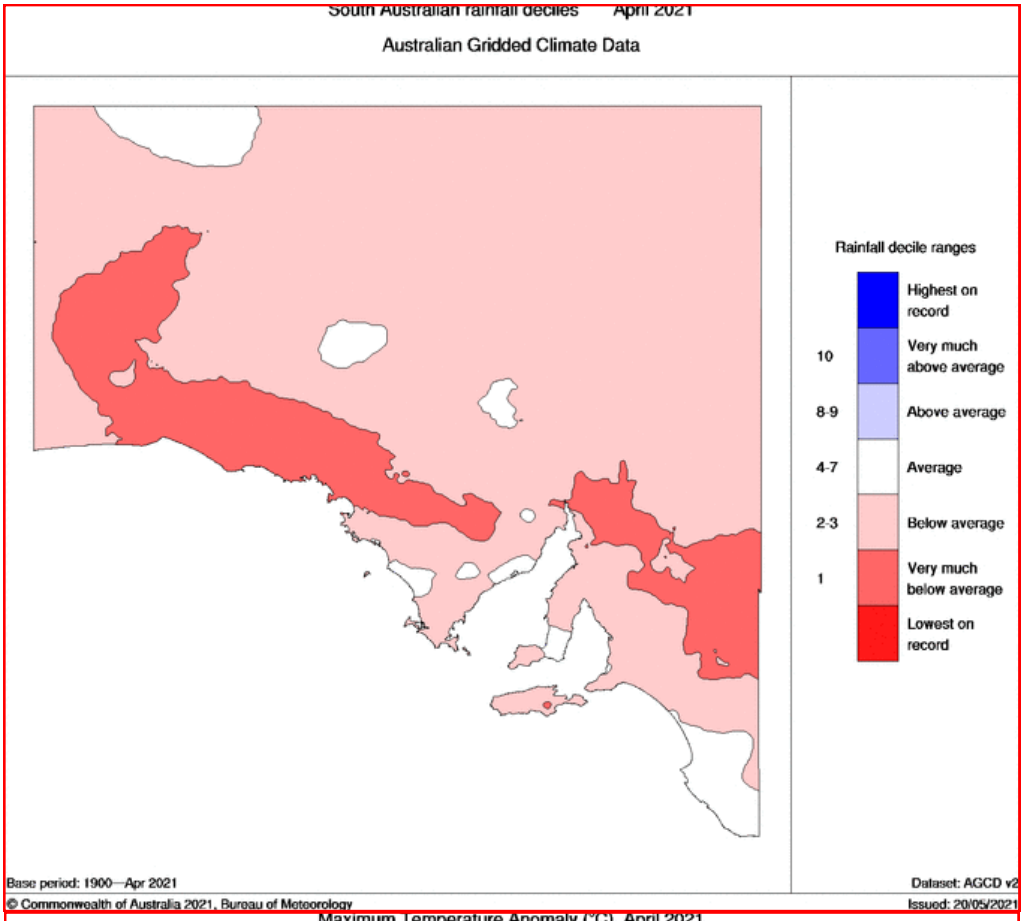
Rainfall in April was less than average at all sites across Adelaide and the Hills, with monthly totals particularly below average in the northern suburbs. Daytime temperatures were above average during the first week of April, but were close to average or cooler than average through most of the rest of the month. Night-time temperatures were generally close to average, but slightly warmer than average near the start of the month, followed by several cold nights on the 12th and through the second half of April.

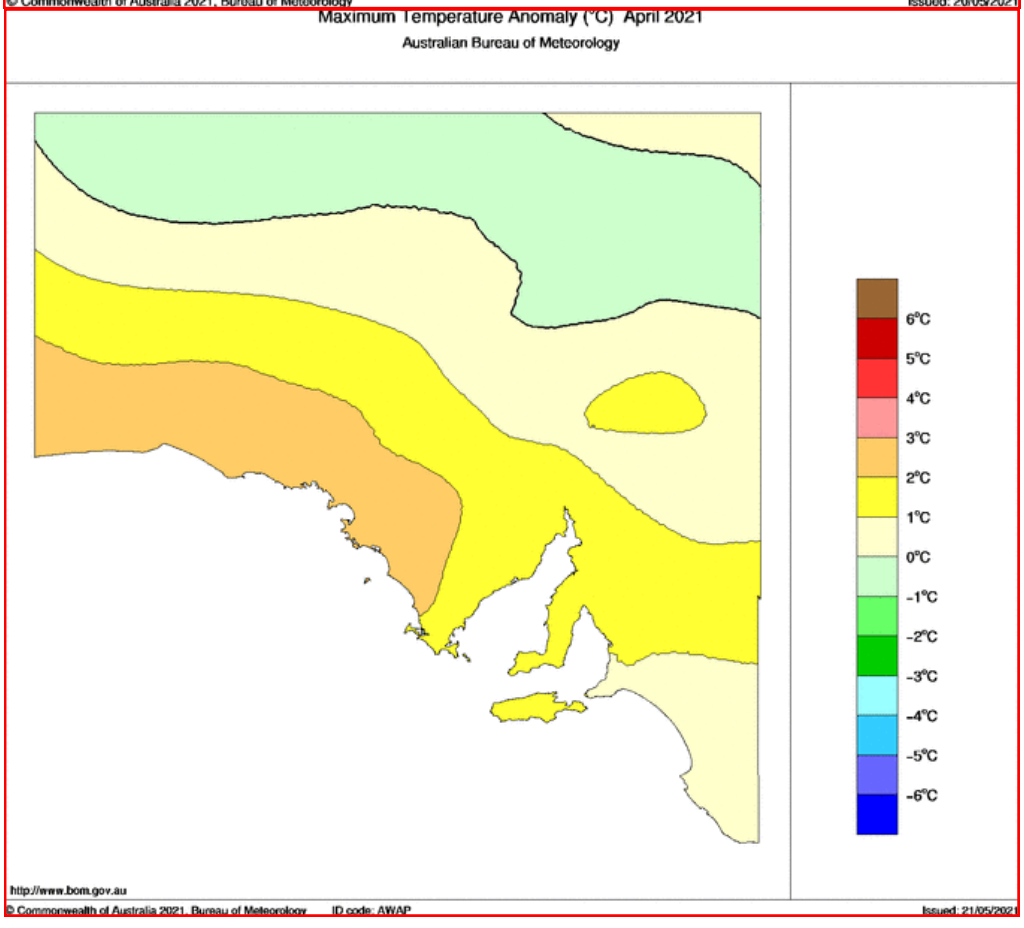
For more information plus a summary of April's statistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202104.adelaide.shtml

South Australia in April 2021: very dry, some warm days, cool nights in the north and east

Rainfall in April was below to very much below average across most of South Australia. It was the state's seventh-driest April on record and driest since 1997. Day-time temperatures for April were above to very much above average across much of southern South Australia, but night-time temperatures were cooler than average in most districts away from the West Coast.

For more information plus a summary of April'sstatistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202104.summary.shtml





Adelaide (West Terrace / Ngayirdapira), South Australia
May 2021 Daily Weather Observations

The official site for Adelaide, having reopened in May 2017.

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Sa	16.8	29.0	0			NNW	41	15:39	23.2	33		NNE	15	1020.6	28.1	23		NNW	20	1017.1
2	Su	13.6	21.1	0			WSW	26	12:03	17.0	76		NNW	7	1021.8	20.8	52		WNW	9	1020.3
3	Mo	10.7	20.3	0			SW	35	15:16	14.4	77			Calm	1023.3	18.6	60		SW	17	1022.1
4	Tu	8.9	17.6	0			SSW	39	12:56	13.8	58		SSW	7	1027.2	16.2	38		SSE	17	1024.9
5	We	7.2	19.6	0			SW	19	14:30	13.4	55			Calm	1025.9	18.3	45		WSW	13	1022.4
6	Th	8.7	21.9	0			NE	22	21:37	15.1	55		NE	9	1020.6	20.6	34		N	6	1016.4
7	Fr	14.8	22.4	0			NE	22	00:49	16.4	43		NE	11	1014.8	21.5	38		NNW	6	1012.7
8	Sa	11.8	19.6	0			SW	30	11:50	16.2	74		NNE	7	1016.0	17.0	81			Calm	1015.5
9	Su	12.1	19.3	2.0			WNW	30	12:36	13.8	92		N	9	1020.0	18.3	62		WNW	13	1016.9
10	Mo	12.5	17.1	7.0			SW	54	11:09	15.5	66		SW	24	1014.0	15.7	67		SW	20	1016.3
11	Tu	10.5	16.6	0.8			ESE	31	12:36	13.3	73		S	9	1025.3	13.7	63		SE	20	1024.5
12	We	5.1	17.2	0			WSW	24	14:58	10.9	72		NNE	4	1025.1	15.1	57		W	15	1020.6
13	Th	9.1	16.5	0			SW	39	13:25	11.8	77		N	11	1017.0	15.4	61		SW	17	1018.0
14	Fr	11.0	17.0	9.8			WSW	39	03:20	15.0	60		SW	17	1021.6	15.1	70		SW	17	1021.1
15	Sa	11.5	16.6	2.2			SSW	30	09:28	13.7	60		S	11	1025.8	15.9	54		SW	13	1025.4
16	Su	11.8	17.6	0			W	28	12:40	13.7	65			Calm	1027.5	16.1	59		WSW	13	1025.7
17	Mo	12.7	18.0	0			WSW	24	12:21	14.8	58			Calm	1029.4	16.0	56		WSW	11	1028.3
18	Tu	6.7	19.0	0			NW	26	12:20	12.4	67		NNE	6	1029.4	18.4	41		WNW	9	1026.0
19	We	10.6	19.9	0			NNW	35	12:18	13.9	46		NNE	11	1026.5	18.6	38		NNW	19	1023.4
20	Th	12.8	21.9	0			NE	19	03:15	16.0	43		NNE	6	1027.2	18.9	42		SW	7	1026.3
21	Fr	7.6	24.9	0			NNW	20	13:16	15.1	56			Calm	1028.8	24.6	18		NNW	9	1024.8
22	Sa	14.1	23.7	0			NE	20	07:46	16.2	35		NE	11	1024.3	23.2	17		NNW	9	1020.9
23	Su	13.0	24.8	0			NNE	30	10:44	18.1	36		NE	13	1022.3	24.5	22		N	13	1018.7
24	Mo	18.1	25.4	0			NNE	43	20:38	20.2	36		NNE	19	1018.1	23.3	30		NE	15	1013.4
25	Tu	13.3	17.2	13.8			WSW	65	14:01	13.8	90		N	11	1010.9	13.5	74		WNW	20	1011.8
26	We	11.4	16.7	1.0			SW	41	04:28	14.5	52		SSW	19	1024.2	16.0	57		WSW	17	1025.6
27	Th	9.5	17.9	1.4			WSW	30	13:08	12.8	84		N	4	1032.4	17.3	65		SW	13	1031.6
28	Fr	8.7	17.4	0			ESE	20	08:30	13.7	78		ESE	11	1034.6	16.6	64		WSW	6	1032.3
29	Sa	6.4	16.8	0			WSW	17	15:13	10.8	65		NNE	6	1033.8	15.2	54		W	7	1029.6
30	Su	3.5	17.7	0			NNE	22	12:21	11.3	56		N	9	1027.3	16.7	40		NW	11	1024.5
31	Mo	7.4	15.9	0			NE	26	23:54	11.9	31		NE	13	1022.3	15.5	30		NE	9	1018.3
Statistics for May 2021																					
Mean		10.7	19.6							14.6	60			9	1023.8	18.2	48			12	1021.8
Lowest		3.5	15.9							10.8	31			Calm	1010.9	13.5	17			Calm	1011.8
Highest		18.1	29.0	13.8			WSW	65		23.2	92		SW	24	1034.6	28.1	81		#	20	1032.3
Total				38.0																	

Observations were drawn from Adelaide (West Terrace / Ngayirdapira) {station 023000}

This is the "official" site for Adelaide, having reopened in May 2017. Observations are available from the Kent Town site {station number 023090} up until 31 July 2020.

IDCJDW5081.202105 Prepared at 13:04 UTC on 2 Jun 2021

Greater Adelaide in May 2021: below average rainfall

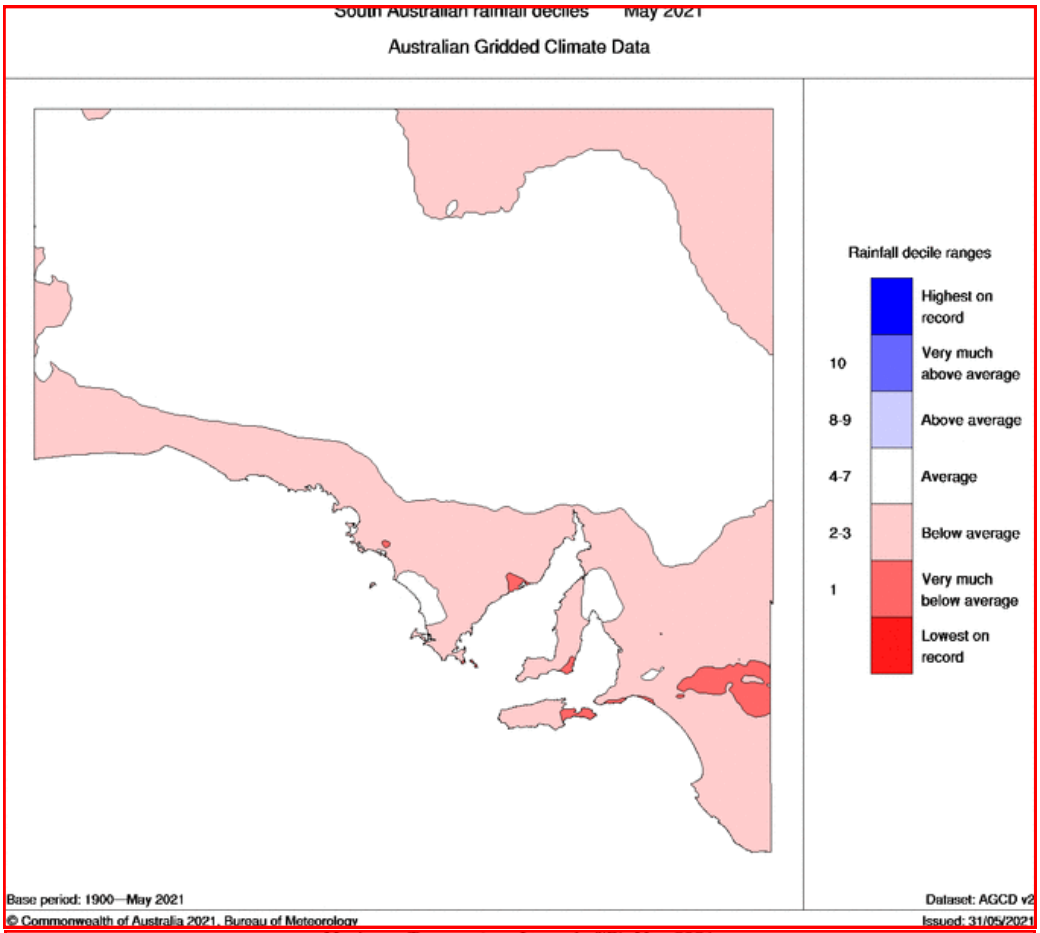
Rainfall in May was below average across Adelaide and the Hills, with all sites recording no more than 70% of their monthly average rainfall. Despite a cool end to the month, mean maximum temperatures were generally warmer than average at sites across Adelaide and the Hills, with night-time temperatures closer to the May average.

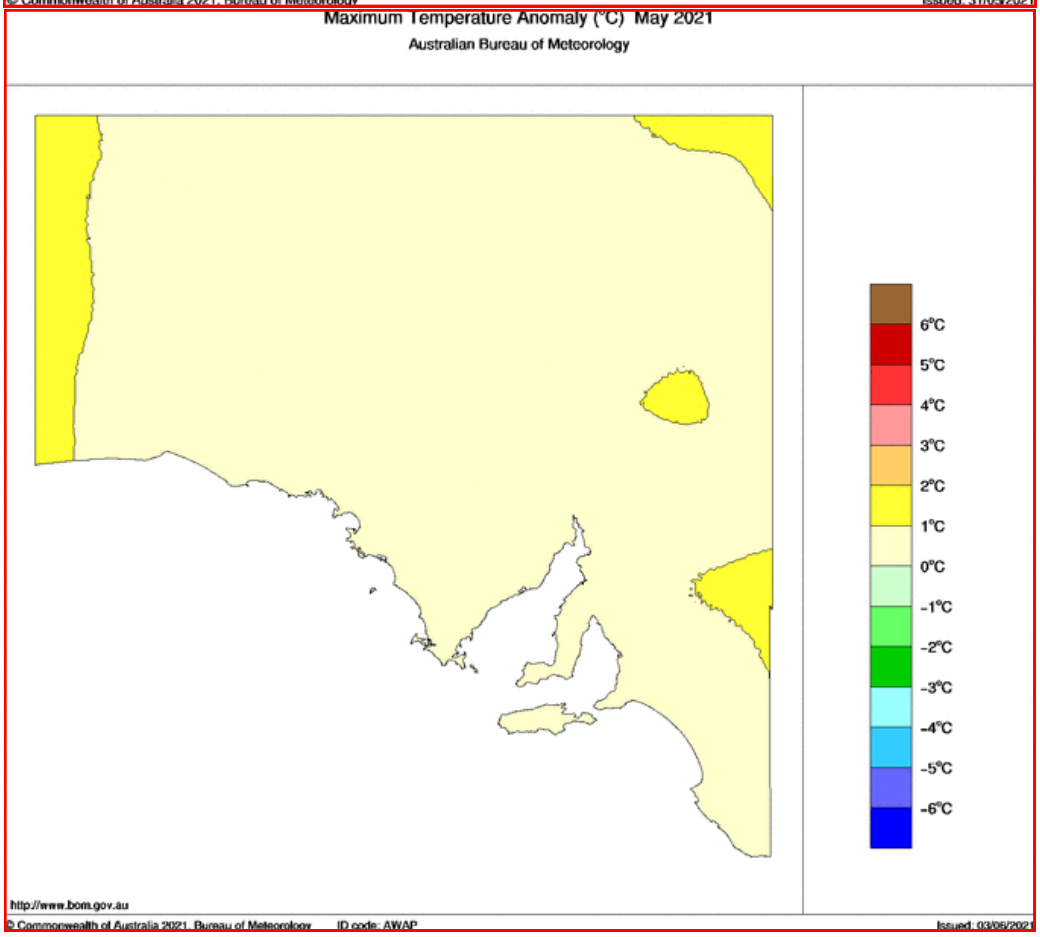
For more information plus a summary of Maysstatistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202105.adelaide.shtml

South Australia in May 2021: drier than average

Rainfall in May was below average for most Agricultural districts of South Australia. Daytime temperatures for May were generally close to or warmer than average, but night-time temperatures tended to be cooler than average across much of eastern South Australia.

For more information plus a summary of Maysstatistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202105.summary.shtml





NEXT MEETING

7.00 PM TUESDAY 15 June 2021

(Please note the change of time)

St Saviour's Anglican Church, 596 Port Rush Road, Glen Osmond.

As numbers are limited please register for this event at:

https://www.eventbrite.com/e/weather-bushfires-understanding-a-complex-relationship-tickets-157142697037?aff=ebdssbdestsearch

Please note that the BOM still has restrictions on non-essential personnel using their facilities, so an alternate venue is being used. All Covid requirements for this venue will be complied with.

There is a fee for the rental of the hall, and while the meeting is free, a donation at the door to help with the hire of the hall will be appreciated.

Presentation : WEATHER & BUSHFIRES understanding a complex relationship

Speaker: Dr Mika Peace, Bureau of Meteorology.

Dr Peace, working from the Bureau of Meteorology, is a lead researcher in the Bushfire and Natural Hazards Cooperative Research Centre. She has a national profile, extensive practical experience in fire weather and a wealth of knowledge of major bushfires across Australia. She will discuss basic fire-atmosphere interactions, outline the learnings from the 2019-20 Black Summer fires, and emphasise the importance of developing relationships between Australia's extensive emergency management agencies.

Prolonged droughts coupled with hot windy weather can be a lethal combination for starting bushfires in Australia. We have had several notable reminders of this fatal relationship and the Bureau of Meteorology states that, with climate change, "Bushfire weather conditions in future years are projected to increase in severity for many regions of Australasia".

Recent research has focussed on the complex inter-relationship between meteorology and bushfires. These fire-atmosphere interactions happen at different scales and are critically important in anticipating fire behaviour and how effectively we can react.

For further information about AMETA & meeting details please contact:

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For newsletter contributions, comments or suggestions please contact
monana@ameta.org.au