Australian Meteorological Association Inc

Monana

THE OFFICIAL PUBLICATION OF THE AUSTRALIAN METEOROLOGICAL ASSOCIATION INC
April 2021

From The President's Pen

We are now entering a phase where a vaccine against COVID-19 is becoming available. From all the available scientific medical evidence, these vaccines are safe and effective. While there can be serious side effects for people with certain conditions such as severe allergic reactions (anaphylaxis and the like), for most of us, the protection afforded by the vaccine will vastly outweigh the minor side effects that are being reported. Naturally everyone is different, so if you have concerns please consult your doctor (and I don't mean Dr. Facebook). We want to see everyone back to physical meetings protected from COVID-19 as soon as practical.

While we can hope that by the end of this year things will return to a more relaxed social environment, the AMetA will still have some troubling issues to deal with in the changed environment of post-COVID. Many things will remain changed as people learn from COVID and realise that it could easily happen again. For example the chance of having meetings back in the BOM is just about zero.

We have had meetings at Glenn Osmond, but personally it took me well over an hour travelling through peak hour traffic to get there by 6pm. I think a more central meeting location in the Central Business District (CBD) would be more convenient for most people, but that will depend on finding a suitable venue.

Less obvious, but a potentially greater concern to the Committee is the cost of the meeting venues. A typical cost for a meeting room is from about $25 per hour. Assuming that a meeting requires in total 3 hours, that is at least $75 per meeting. Assuming that there are only five (5) meetings per year, that is $375. However, many of these venues require the group hiring the hall to provide a Public Liability Insurance (PLI) certificate to meet the requirements of the hall's Risk Management Plan. The cost of PLI for a single meeting is about $200, with an annual policy being about $600.

From a best case scenario where we met at the BOM costing nothing, we now face a worst case scenario in which it may cost about $1000 per annum for a meeting room requiring insurance. As you can understand, the Committee would ideally like to find a free meeting room that did not require PLI. Reality is probably somewhere in between.

There is also a chance we could lose the use of the BOM post box. This may not become an issue, but the worst case will require an additional $140 per annum. Putting all the possible costs together, the maximum cost needed to run the Association would be about $1,500 per annum—about $40 per current member.

The AMetA membership fee has not risen to cover the cost of the inflation over the years, and this year the membership fee was waived, so a membership fee for 2021-

2022 of $20 is not unreasonable. However, with a current membership of about 40 people even that fee increase would not cover the worst-case costs the AMetA could face.

At the last meeting (which was an excellent presentation as anyone who attended will agree), visitors were asked to contribute a donation to help pay for the hall. That $30 of donations was a useful amount, but not enough to offset the cost of hiring the hall.

The AMetA has sufficient funds to tide itself over until the current uncertainties are resolved. What the final solution will be is currently unknown, but I have no doubt that it must involve a concerted membership drive. An increase in membership seems the only long lasting solution to the changes that the AMetA is experiencing. I think that the AMetA needs to launch itself into the world of social media. It is an area where I think the Committee would appreciate hearing from members who would like to help the Association in that area.

I will be spending April and half of May travelling on the Ghan from Darwin to Adelaide and then houseboating on the RMBOA River Ramble, so I will miss the April Member's Meeting. I'm sure you will find it interesting.

Keep Happy, Keep Safe.

Mark Little email: president@ameta.org.au

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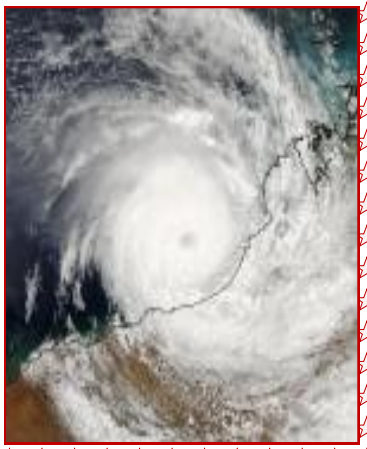
ATTENTION ALL SCRIBES AND PHOTOGRAPHERS

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)*

Air Quality Monitoring in South Australia

Courtesy of Beth Walton

Dr Pushan Shah, Principal Scientific Officer (Air Quality) from the South Australian Environment Protection Authority (EPA) gave a very interesting presentation on air quality monitoring at our recent AGM.

EPA has been monitoring air quality in South Australia's since the 1970's. It also has a regulatory role in controlling emissions that contribute to pollution.

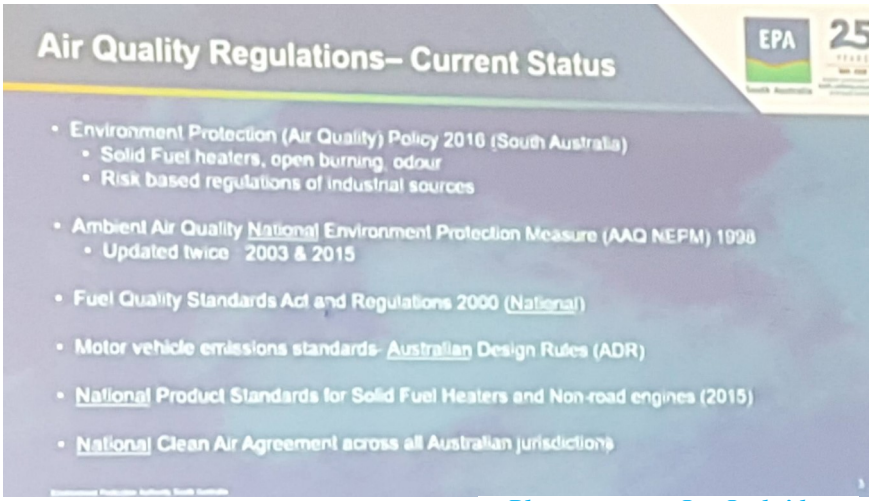


Photo courtesy Jon Letbridge

Pollutants monitored include particulates and harmful gases. Emissions may be from industrial, domestic or natural sources. Significant sources include solid fuel heaters (eg wood heaters) and motor vehicle exhausts (nitrogen oxides) – for both of which national standards exist. Bushfires and dust storms can also cause major pollutant events while other sources include industrial processes, stationary engines and some gardening equipment such as lawn mowers.

Particulates are characterised by their size – those monitored are PM10 – ie dimensions ≤10μ such as dust, and PM 2.5 (≤2.5μ) including vehicle exhaust and bushfire smoke. (For comparison small visible airborne particles have dimensions around 100μ (microns[1]), pollen ~15μ and virus molecules ~0.9μ. (The smaller the size – the deeper a particle can penetrate into the lungs.))

Pollutant	Averaging period	Standard	Maximum allowable exceedences
Carbon monoxide (CO)	8 hours	9.0 ppm	1 day a year
Nitrogen dioxide (NO_2)	1 hour	0.12 ppm	1 day a year
	1 year	0.03 ppm	None
Sulfur dioxide (SO_2)	1 hour	0.20 ppm	1 day a year
	1 day	0.08 ppm	1 day a year
	1 year	0.02 ppm	None
Photochemical oxidants (as ozone O_3)	1 hour	0.10 ppm	1 day a year
	4 hours	0.08 ppm	1 day a year
Lead (Pb)	1 year	0.5 μg/m³	None
Particles as PM_{10} (a)	1 day	50 μg/m³	5 days a year
Particles as $PM_{2.5}$ (a)	1 day	25 μg/m³ (b)	1 day a year
	Annual	8 μg/m³ (b)	Not applicable

National Environment Protection Measure Standards for Ambient Air Quality

Harmful gases monitored include ozone (formed through a photochemical reaction in the lower atmosphere, carbon monoxide, sulphur dioxide and nitrogen oxides (NOx, from vehicle emissions). During the 2020 COVID lockdowns significant reductions in city traffic saw NOx concentrations at those monitoring sites drop substantially.

EPA works with SA Health to better understand the impacts of air quality. Recent research indicates that fine particles pose the greatest risk to Australian communities. There is also increasing evidence that even relatively low levels of air pollution can have adverse effects on our health. Consequently any improvement in air quality will result in improved health outcomes.

Working with the Bureau of Meteorology has enabled the identification of atmospheric conditions conducive to significant events. Using this and SA Health data it is possible to

1. 1 micron = 10-6 metres

provide alerts (eg for asthma incidence) for groups particularly susceptible or sensitive to poor air quality such as children, the elderly and those with existing respiratory and cardiovascular conditions.

There is potential for South Australia's air quality to get worse in the future due to the impacts of climate change on dust storms and bushfires, and population growth and subsequent traffic increases.

EPA currently has 6 monitoring stations around Adelaide, including in Victoria Square, Netley, Modbury, Christies Beach and two on Lefevre Peninsula. Real time data from these sites is available at Air quality monitoring | EPA ..

Portable monitoring units, which include meteorological sensors to measure wind velocity, temperature etc are also deployed to investigate particular events.

Plantower PMS5003 Digital universal particle concentration sensor". - shown by Dr. Sha Photo courtesy Jon Letbridge

EPA has a policy of partnering with communities, government and other organisations to support better environmental outcomes and Dr Shah seemed genuinely keen to explore collaborative possibilities with AMETA as it establishes its new Special Interest Personal Weather Station (PWS) Group. He finished his presentation giving examples of low-cost air quality sensors suitable for installation on PWS, such as PM2.5monitors for $25, online tools to evaluate sensor data quality, and community projects such as KOALA which measures traffic emissions on Victoria Rd, Osborne.

The presentation raised a lot of interest amongst the audience – with question time extending beyond 20 minutes.

A Todd Anecdote *by Mac Benoy*

For three years, our Citizen History team have been researching the professional life of Sir Charles Todd. Given the man's high profile in colonial society, his story plays out very publicly in the press of the day. The team is turning up many of his activities that colour-in the dedication he brought to his pioneering efforts in establishing the technological and scientific foundations of our country.

Todd famously travelled to Melbourne in mid 1856, only 9 months after arriving in dusty Adelaide with its population of about 17,000. He sailed there to confer with an ex-colleague from Cambridge/Greenwich, to agree to the building of an Adelaide-Melbourne telegraph line. He then sailed back to Portland, on the Vic-SA border, and rode a horse back to Adelaide to scout the route of the line. On today's roads, that's a 750 km trip. Long, but straightforward enough. But ponder, maybe not!

1. There was no main road to Adelaide. The first European settler had only arrived 20 years previously. Inter colonial horse-bound traffic would have been sparse and probably took the inland trail. The coastal route would have been a series of local farm tracks, some of which came to a dead end. How come Todd didn't get confused and lost?
2. He was a city nerd from urban England, so how, without maps or any other route-knowledge, did he find his way through semi-wild country that would have been utterly alien to him?
3. Did this European nerd even know how to ride a horse?
4. Did Victorian city-gentlemen routinely learn how to ride a horse like modern teenagers learn to drive a car? Probably not, they walked and took trams pulled by horses, or at best, Hansom Cabs.

Team member Gavin Beinke pondered on this and found the answer in an annex to an email from a Todd relative in London who's part of our team. The email included the diary of a "Trooper Euwin". It turns out that Euwen escorted Todd the whole way, and he recorded the epic trip in his diary. Euwin is another of those souls lost to history. He seems to have been "your man" for all country travel. He worked with Todd down through the years including on the Overland Telegraph and also when Todd set the S.A. border with NSW, plus many other outings. Euwin even went back after the Victoria trip to put in the pegs for the line that he and Todd had surveyed.

And the horse? Euwen's diary records that Charles didn't know how to ride a horse and he had to learn as they travelled. The diary records that the horse WAS NOT HAPPY!

So, just to map a fundamental piece of technology, Todd committed to a 1,000km trip (remember, full of dead-end trails) through strange scrub and forest while learning how to ride an unhappy horse. Tell me that's not heroic!

2020 ANNUAL GENERAL MEETING PRESIDENT/TREASURER REPORT

Photo courtesy Jon Lethbridge

- This meeting incorporates the 2020 Annual General Meeting, delayed under the COVID-19 provisions of 2020.
- This is the first physical meeting for approximately 12 months. Contact with the membership has been maintained via the Monana electronic magazine and the AMetA website
- The membership fees for the 2020-2021 financial year were reduced from $15 to $0 to recognise the reduced meetings in the 2019-2020 and 2020-2021 membership years. Free membership extends to October 2021, so new members will receive free membership until then. *Join now for free, only renew when fees return if you like the AMetA's activities.* ☺
- Access to the BOM meeting room was removed at the start of the COVID-19 pandemic to protect an essential service. The use of that free room is unlikely to be restored in the near future, if ever.

- Many alternate venues charge a fee for the meeting. Some venues (hotels such as the Tower Hotel, Magill) will provide a free meeting room if members dine in the bistro before the meeting. *Alternatives under investigation.*
- The start-up of the PWS Group stalled last year when the COVID pandemic hit.
- Discussions with the Port Adelaide Enfield (PAE) Council STEM (Science Technology Engineering Maths) Officer have occurred and there is an offer of a free meeting room at one of the PAE libraries. The PWS Group will cover multiple facets of Personal Weather Stations including recording and analysing readings from your own weather station or observations from the BOM, using your home PC (Windows/Linux/Mac) as well as the Raspberry Pi and Arduino microprocessors.
- The PAE council runs an "Introduction to the Arduino" group where interested individuals can learn the basics about the Arduino microprocessor and hardware.
- It is likely that the (free) sessions will be run fortnightly on a Saturday, interleaved with the "Introduction to Arduino" sessions. If you are interested, please visit our website and look for the PWS-oriented magazines under the "Members" tab which is currently open to the public. *Unfortunately any links in the magazine to the software examples will currently be unavailable as my home web-server has died and I am currently rebuilding the software on a new computer.*
- Due to personal circumstances, the Treasurer elected at the 2019 AGM has resigned and the President (Mark) is standing in until the 2021 AGM when the next election of the Committee members is due.
- The AMetA's operating account contains $3,661.12. There is $50.00 in petty cash, along with the $2,000 term deposit (16- February-2021). A $3.92 deposit to the operating account is pending. This gives a total of $5,715.04.
- Because membership is currently free (even to new members), any donations to help cover this year's operating costs like hall hiring fees would be appreciated.
- The Committee is monitoring the financial situation to ensure that the Association's assets are used judiciously during this period of limited income.

The Southern Cloud - A Tale of Forecasts and Communications

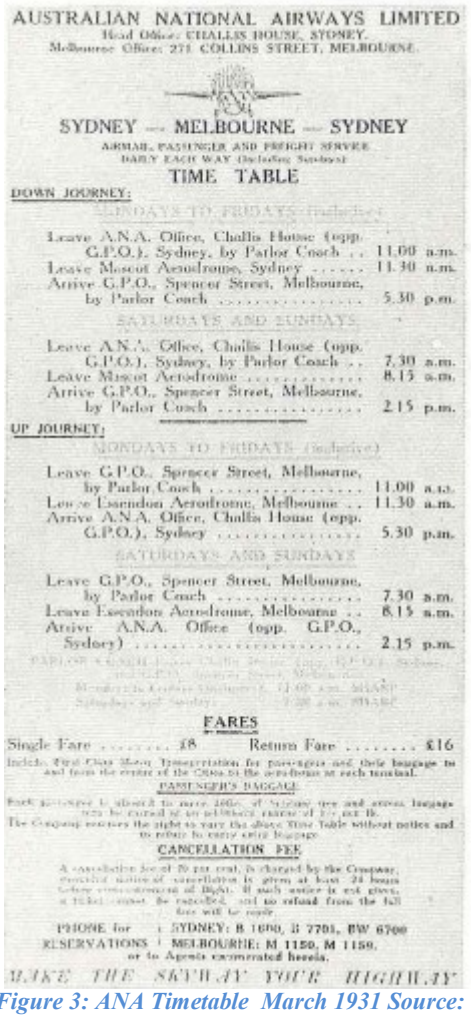
by Bruce Davis

Many of you may have been to Cooma in NSW and seen the memorial to the Southern Cloud (VH-UMF), an Avro 10 aeroplane that crashed in the Snowy Mountains 1931 killing all on board. This was Australia's first major airline disaster. The memorial houses relics from the aeroplane (see Figure 1). Although the accident occurred on Saturday March 21 1931, the wreckage was not discovered until October 26 1958. The accident is not only of interest in itself but also had significant meteorological implications.

Figure 1: Southern Cloud Memorial Cooma. Source: Visit NSW

Figure 2: Southern Cloud Source: South Coast Register

The aeroplane (see Figure 2) was one of five Australian National Airways Limited Avro 10s flying daily services between Brisbane, Sydney, Melbourne and Launceston (see Figure 3). The airline was established in 1929 by Charles Kingsford-Smith and C. T. P. Ulm, and had operated since January 1930 without serious incident.



AUSTRALIAN NATIONAL AIRWAYS LIMITED

Head Office: CHALLIS HOUSE, SYDNEY.
Melbourne Office: 271 COLLINS STREET, MELBOURNE.

SYDNEY — MELBOURNE — SYDNEY

AIRMAIL, PASSENGER AND FREIGHT SERVICE
DAILY EACH WAY (Including Sundays)

TIME TABLE

DOWN JOURNEY:

MONDAYS TO FRIDAYS (inclusive)

Leave A.N.A. Office, Challis House (opp. G.P.O.), Sydney, by Parlor Coach	11.00 a.m.
Leave Mascot Aerodrome, Sydney	11.30 a.m.
Arrive G.P.O., Spencer Street, Melbourne, by Parlor Coach	5.30 p.m.

SATURDAYS AND SUNDAYS

Leave A.N.A. Office, Challis House (opp. G.P.O.), Sydney, by Parlor Coach	7.30 a.m.
Leave Mascot Aerodrome	8.15 a.m.
Arrive G.P.O., Spencer Street, Melbourne, by Parlor Coach	2.15 p.m.

UP JOURNEY:

MONDAYS TO FRIDAYS (inclusive)

Leave G.P.O., Spencer Street, Melbourne, by Parlor Coach	11.00 a.m.
Leave Essendon Aerodrome, Melbourne	11.30 a.m.
Arrive A.N.A. Office, Challis House (opp. G.P.O.), Sydney	5.30 p.m.

SATURDAYS AND SUNDAYS

Leave G.P.O., Spencer Street, Melbourne, by Parlor Coach	7.30 a.m.
Leave Essendon Aerodrome, Melbourne	8.15 a.m.
Arrive A.N.A. Office (opp. G.P.O., Sydney)	2.15 p.m.

FARES

Single Fare ..... £8 Return Fare £16

Includes First Class Motor Transportation for passengers and their baggage to and from the centre of the Cities to the aerodromes at each terminal.

PASSENGER'S BAGGAGE

Each passenger is allowed to carry 44lbs. of personal effects and excess baggage may be carried at an additional charge of 1/- per lb.

The Company reserves the right to vary the above Time Table without notice and to refuse to carry excess baggage.

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A cancellation fee of 20 per cent. is charged by the Company, provided notice of cancellation is given at least 24 hours before commencement of flight. If such notice is not given, a ticket cannot be cancelled, and no refund from the full fare will be made.

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MAKE THE SKYWAY YOUR HIGHWAY

Figure 3: ANA Timetable March 1931 Source: ATSB

No aviation meteorological service existed in Australia at that time, unlike today (see http://www.bom.gov.au/aviation/), but the Sydney Weather Bureau would arrange for a detailed 24 hour forecast to be available to the various air services at 10:30 am daily. Additionally, each morning the Bureau prepared a detailed report of weather conditions between Melbourne, Sydney and Brisbane for Australian National Airways Ltd. Senior pilots made a practice of telephoning for this report before departing on a flight. In the event of unexpected or unusually severe weather conditions, the Bureau would also prepare a special advice and telephone it to the operators concerned. However the accuracy of these forecasts was limited as the Bureau received weather observations from throughout New South Wales only once each day at 9 am, and there was little exchange of information with forecasters in other States.

On Saturday 21st March 1931 the aeroplane was scheduled to depart Sydney for Melbourne at 8:15 am. Because the Weather Bureau did not open until 9:00 am each morning, planning for this flight used the Bureau's

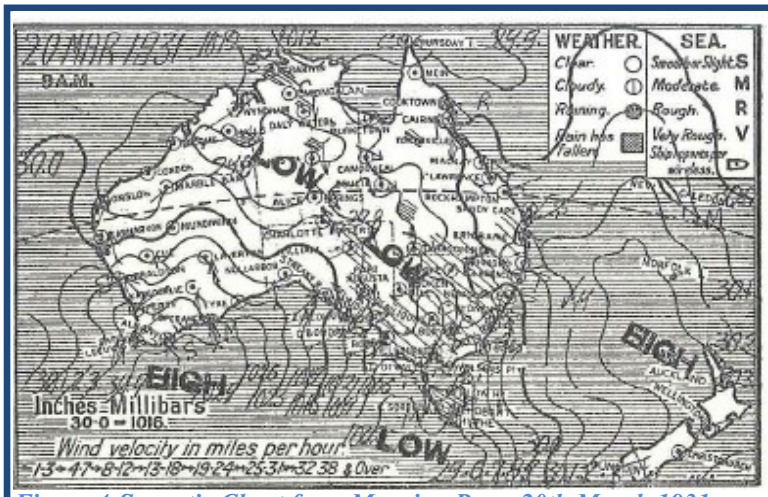


Figure 4:Synoptic Chart from Morning Press 20th March 1931
Source: ATSB:

general forecast and synoptic chart as published in the morning's newspapers (the practice of the company's pilots when departing on early morning flights). This forecast (the latest weather information available) had been prepared the previous afternoon (see Figure 4). It is somewhat mind boggling to consider the inaccuracies that could result from planning a flight based on a synoptic chart and forecast published in the daily newspaper.

There had been heavy rain in Sydney that morning, but by 8 am it was fine, though cloudy with a cloud base of about 3,000 feet. A light north wind was blowing at ground level However, it was obviously much stronger at altitude. The day's forecast indicated cloudy and unsettled weather with rain, thunderstorms and strong winds from the north at first, with a cool, squally, southerly change spreading from the west later. To Captain T. W. Shortridge, the weather appeared no worse than on many other occasions when flights had operated. So Southern Cloud took off for Melbourne at 8:10 am with the captain, co-pilot Charles Dunnell and six passengers aboard, setting course below the cloud base.

It was more than twenty-seven years before the Southern Cloud was seen again.

The morning of the flight, Melbourne, north-eastern Victoria and southern NSW experienced continuous rain, exceptionally strong winds blowing from the south-west, extremely poor visibility and a low cloud base from 300 to 1,500 feet.

When the state-wide 9 am observations were received in Sydney, it was obvious that conditions were far worse than forecast. A detailed report was telephoned to Australian National Airways. But by this time the Southern Cloud was well on its way and there was no way of communicating any warning to the aeroplane.

The failure of the aeroplane to arrive at Essendon Aerodrome by early afternoon did not initially a cause alarm. It was thought that Captain Shortridge had probably landed at an intermediate aerodrome to refuel and decided not to continue the flight that day. But by late afternoon it was clearly evident that the appalling weather was widespread resulting in grave disquiet. By this time the severity of the conditions had been confirmed by another company pilot, Captain G. U. Allen, who had flown from Melbourne to Sydney that day in command of the sister aeroplane, the "Southern Sun".

No official search and rescue organisation then existed, but the company immediately made plans to commence a search early the following morning using three of its aeroplanes. Senior officers of the Civil Aviation Department, which at that time was a division of the Department of Defence, were officially notified of this. The news that the Southern Cloud was overdue spread alarm through the infant aviation industry and, within hours, the company's aeroplanes had been joined by numerous private, club, business and service aeroplanes. The Civil Aviation Department co-ordinated the search. In addition a number of locally organised ground searches were carried out.

Finally, after 18 days of searching by more than 20 aeroplanes, during which every possible forced landing area had been checked at least once, it was reluctantly concluded that the occupants of the aeroplane could no longer be alive and the search was officially brought to a close. But the company refused to give up and for several weeks continued to carry on the search using one of its own aeroplanes, in the hope that some trace would be found of the missing Avro 10.

Meanwhile, the Minister for Defence had requested the Air Accidents Committee conduct an open investigation into the loss, with a view to recommending actions to help prevent a similar occurrence. After sitting for three weeks and hearing a great deal of evidence from ANA executives, meteorologists, pilots, ground engineers and Departmental Officers, the Committee found that it could not establish what had happened to the missing aeroplane, but believed that the extreme weather conditions had contributed to its loss. The Committee thought that the crew probably anticipated moderately bad conditions over the route but not the extreme conditions which actually prevailed. Under the existing arrangements, these extreme conditions could not have been foreseen before the aeroplane departed.

The Committee went on to make a large number of recommendations. The most significant were that two-way radio be compulsory in aeroplanes engaged in regular scheduled passenger services, and that the Department urgently arrange for the provision of a ground/air radio communication organisation. There were also a number of important recommendations aimed at improving meteorological services for aviation.

The loss of an aeroplane, the heavy expense incurred by the protracted search, the resulting damage to reputation and public confidence, and the developing financial depression of the thirties was to prove too much for ANA. A few months later, Australia's pioneer inter-capital airline, which had begun with such promise, was forced out of business.

But that was not the end of the story.

On the afternoon of Sunday 26th October, 1958, nearly three decades after the aeroplane had vanished, a young Snowy Mountains' worker from a construction camp near the Tooma Dam set out for a walk in the surrounding ranges. As he was clambering through the undergrowth on the side of a steeply sloping valley high above a tributary of the Tooma River, he almost tripped over a structure of rusted tubular steel lying amongst the trees. The mystery of the Southern Cloud was finally solved.

A lookout over the site has been established on the Tooma Road, 5 km north of Tooma. This lookout features an undercover picnic area, along with a series of interpretive story boards that commemorates the loss of the Southern Cloud in the mountain ranges seen from the lookout. (See figure 5)

Figure 5: View from Southern Cloud Memorial lookout Source: Visit Snowy Valleys / Upper Murray

The site of the crash was 20 km east of the direct Sydney-Melbourne track on the south-western side of a densely timbered mountain ridge aligned north-west to south-east. Impact occurred 250 feet below the ridge top and at about 4,500 feet AMSL. Several trees had been burnt out in subsequent bush fires and the timber had regrown, with trunks growing up through the wreckage itself. It was evident, however, that the wreckage had been subjected to a fire of much greater intensity than a bush fire, and indicated that the aeroplane had burnt after impact.

A number of relics were recovered (see Figure 6), including a wrist watch indicating 1.15pm indicating the time of impact.

From the location and general distribution of the wreckage, it was evident that the

aeroplane was in a steeply banked level turn to the right at the time of impact. It was also clear that the aeroplane was heading in a north to north-east direction (almost the opposite of its planned heading) immediately before it struck the ground. The attitude of the aeroplane at impact did not indicate a loss of control, and the evidence indicated that the aeroplane was intact at the time of impact. Because of the fire and impact damage however, as well as the effects of corrosion over the years, it was not possible to determine if there had been any pre-crash malfunction in the engines which could have caused the aeroplane to lose height.

Figure 6: The memorial at the Southern Cloud crash site The memorial at the Southern Cloud crash site. Source: National Museum of Australia

The damage sustained indicated the aeroplane was flying at considerable speed. Given the general weather situation that existed at the time, the aeroplane would likely have had a strong tail wind component when it struck the ridge, resulting in a high ground speed. It is highly likely that, flying in cloud, the pilot only became aware of the ridge when almost upon it and had either unwittingly flown into it or had been forced by some circumstance to descend over the mountainous terrain. The steep turn was, most likely, a last desperate attempt to avoid the ridge.

The practice of ANA's pilots in unfavourable weather was to divert inland after passing Goulburn. This enabled them to pass to the west of the mountains on the direct Sydney Melbourne route. During the proceedings of the Air Accidents Investigation Committee the pilot's colleagues gave evidence that Captain Shortridge invariably flew this inland route when the weather was bad, and that he only flew the direct route in good weather. It therefore seems certain that he would have diverted inland after passing Goulburn.

The weather was mostly fine between Sydney and Goulburn but soon after Goulburn, Southern Cloud would have encountered frontal conditions, with the wind backing from north-west to south-west. Although this change in wind direction would probably have been anticipated, the crew, flying in cloud, would have had no way of knowing to what extent the speed and direction of the wind had changed, and therefore at what angle to head into wind (drift) to allow for this. In estimating the drift the crew would have used the conditions from Sydney to Goulburn and the newspaper forecast. It is probable that the angle adopted would have been far too small for the conditions existing past Goulburn, resulting in the aeroplane being blown towards the mountains.

Despite all reasonable precautions that Captain Shortridge undoubtedly took to follow a safe route, the aeroplane was simply blown off course into high mountainous terrain.

The aeroplane was then in a hazardous situation. Turbulence would have been severe and probably violent at times, with icing conditions above 6000 ft. Heavy rain and hail would almost certainly have been encountered, and the crew, with only elementary flight instruments to assist them, would have been fully occupied in just maintaining control of the aeroplane. It is also likely that there would have been airframe, pitot-tube, propeller

and carburettor icing. This would have greatly compounded their difficulties which would include unreliable airspeed indications, and the possibility of one or more engines losing power. If such a loss of power had occurred, this alone could have forced the aeroplane down below a safe altitude.

The loss of Southern Cloud clearly demonstrated the need for better aviation meteorological services, as well as for air-to-ground radio communications and radio navigational facilities. The conduct of operations without such equipment and facilities was accepted as normal practice at the time and possibly even the need for them was questioned. Flights were regularly conducted in conditions which, except for the abnormal wind strength, were similar to that encountered by the Southern Cloud.

From the mid-1930s the rapid growth of civil aviation in Australia had resulted in increased demands for meteorological services. More frequent weather reports were required, and additional details such as visibility and of cloud heights were needed. Following the loss of the Southern Cloud and other incidents it was realised that a much expanded and improved weather service was required. The first purely aviation Meteorological Office was established in Darwin in 1934 to support the Empire Flying Boat route and, by 1939, the Bureau of Meteorology was operating a total of 23 aerodrome observing offices, including ten providing forecasts and briefing for pilots. Late in 1936, an English expert was brought to Australia to investigate requirements. As a result, the nucleus of an Aviation Meteorological Service was formed in 1937, and qualified Meteorological Officers were placed in charge of newly established airport weather offices. Essendon, Victoria was one of the first of these.

The development of radio communication also followed this accident. In 1934 the first Australian airliner able to use radio took to the skies. This was a de Havilland DH84 Dragon flying with Tasmanian Aerial Services. (In the United States, the first radio-equipped control tower began operations at Cleveland Municipal Airport in 1930. By 1932, most U.S. airlines carried radio equipment.)

As a former supervisor of Aviation and Defence Services in the Bureau of Meteorology put it, “the 1931 tragedy ‘changed aviation meteorology forever’”. (see https://www.atsb.gov.au/media/5774770/asd_73_mar_71.pdf).

The accident investigator himself, closing off the case in 1958, wrote, “The lessons of this accident have been well and truly learnt, and I have no recommendations from the investigation. On the historical side, the accident is a cornerstone in Australian Civil Aviation and, looking back now, I cannot but admire the courage of Shortridge and his contemporaries. If there was any foolhardiness in the way they operated, it was of a sort that is necessary to progress." (see https://www.atsb.gov.au/media/5774770/asd_73_mar_71.pdf).

For further information on this accident, 2 useful references are:

https://www.atsb.gov.au/media/5774770/asd_73_mar_71.pdf).

&

https://www.flightsafetyaustralia.com/2017/03/into-the-abyss-back/#:~:text=From%20Flight%20Safety%20Australia%20July,part%20of%20the%20Snowy%20Mountains.I

METEOROLOGICAL QUIZZES *compiled by Dianne Davis*

When we have an interest in an area, it is often somewhat surprising what knowledge we accumulate over the years, You may wish to test your Meteorological expertise by doing the following puzzles.

Please note: NO exam questions will follow! Answers below.

QUIZ 1 SIMPLE INSTRUMENTS USED TO MEASURE WEATHER METEOROLOGICAL INFORMATION

Can you name the meteorological information measured by each of the following instruments?

Barometer _____

Hygrometer _____

Anenometer _____

Wind Vane _____

Ceilometer _____

Reference, Adapted from http://www.weatherwizkids.com/?page_id=82

QUIZ 2 CLOUD CLASSIFICATION

Clouds are often classified as Low, Middle or High depending on the height of the cloud base. To which category does each of the following clouds belong?

Refernces: ***Manual of Aviation Metrology*** *.Commonwealth BOM (First Edition) 2003* , https://learn.bom.gov.au/mod/book/view.php?id=5580&chapterid=4111

Type of Cloud	**High/Middle/Low**
Altocumulus (Ac)	
Altostratus (As)	
Cirrocumulus (Cc)	
Cirrostratus (Cs)	
Cirrus (Ci)	
Cumulus (Cu)	
Cumulonimbus (Cb)	
Nimbostratus (Ns)	
Stratocumulus (Sc)	
Stratus (St)	

QUIZ 3 METEOROLOGICAL WORD SQUARE

The list below the square contains the 24 words to be found in the puzzle. As you can see, they all have something to do with meteorology.
(Some words are vertical - the others are horizontal and read both forwards and backwards.)

V	P	P	Q	B	B	A	R	O	M	E	T	E	R	M	D	N	V
I	N	U	N	S	T	A	B	L	E	F	A	O	R	G	N	Y	N
S	T	U	W	U	D	R	I	Z	Z	L	E	K	G	U	S	T	L
O	I	S	O	T	H	E	R	M	K	C	Z	N	I	A	R	P	F
B	H	V	X	E	C	U	P	C	I	R	R	U	S	J	W	Z	B
A	P	E	R	E	H	P	S	O	I	B	U	B	E	X	M	P	O
R	T	L	P	R	E	C	I	P	I	T	A	T	I	O	N	R	V
V	U	L	M	S	X	D	N	O	I	S	R	E	V	N	I	E	E
R	W	L	L	I	H	C	D	N	I	W	V	P	C	B	E	S	R
S	S	Z	L	A	M	R	E	H	T	W	H	U	M	I	D	S	C
M	O	J	K	Z	I	D	J	E	F	F	P	W	Z	P	Z	U	A
K	C	M	A	E	R	T	S	T	E	J	Q	F	Z	A	F	R	S
P	Y	F	Y	V	M	G	J	T	S	N	W	X	P	C	G	E	T
R	V	X	K	X	H	E	C	N	E	L	U	B	R	U	T	H	D
M	W	T	S	R	U	B	N	W	O	D	Y	I	D	O	R	E	Z
T	R	O	U	G	H	T	S	O	R	F	A	M	R	E	P	D	D
X	S	F	P	S	U	T	A	R	T	S	O	B	M	I	N	T	J
E	N	O	I	T	A	R	O	P	A	V	E	N	R	G	L	X	U

BAROMETER	BIOSPHERE	CIRRUS	DOWNBURST
DRIZZLE	EVAPORATION	GUST	HUMID
INVERSION	ISOBAR	ISOTHERM	JETSTREAM
NIMBOSTRATUS	OVERCAST	PERMAFROST	PRECIPITATION
PRESSURE	RAIN	THERMAL	TROUGH
TURBULENCE	UNSTABLE	WINDCHILL	ZERO

Compiled by D. Davis. March 2021

ANSWERS QUIZ 1: SIMPLE INSTRUMENTS USED TO MEASURE WEATHER METEOROLOGICAL INFORMATION

1. Atmospheric Pressure 2. Humidity 3.Wind Speed 4. Wind Direction
5. Cloud Base Height

ANSWERS QUIZ 2: CLOUD CLASSIFICATION

Type of Cloud	**High/Middle/Low**
Altocumulus (Ac)	Middle
Altostratus (As)	Middle
Cirrocumulus (Cc)	High
Cirrostratus (Cs)	High
Cirrus (Ci)	High
Cumulus (Cu)	Low
Cumulonimbus (Cb)	Low
Nimbostratus (Ns)	Middle (may sometimes be classified as Low
Stratocumulus (Sc)	Low
Stratus (St)	Low

ANSWERS QUIZ 3: METEOROLOGY WORD SQUARE

The words to be found are highlighted.

V	P	P	Q	B	***B***	***A***	***R***	***O***	***M***	***E***	***T***	***E***	***R***	M	D	N	V
I	N	***U***	***N***	***S***	***T***	***A***	***B***	***L***	***E***	F	A	O	R	G	N	Y	N
S	T	U	W	U	***D***	***R***	***I***	***Z***	***Z***	***L***	***E***	K	***G***	***U***	***S***	***T***	L
O	***I***	***S***	***O***	***T***	***H***	***E***	***R***	***M***	K	C	Z	***N***	***I***	***A***	***R***	P	F
B	H	V	X	E	C	U	P	***C***	***I***	***R***	***R***	***U***	***S***	J	W	Z	B
A	P	***E***	***R***	***E***	***H***	***P***	***S***	***O***	***I***	***B***	U	B	E	X	M	***P***	***O***
R	T	L	***P***	***R***	***E***	***C***	***I***	***P***	***I***	***T***	***A***	***T***	***I***	***O***	***N***	***R***	***V***
V	U	L	M	S	X	D	***N***	***O***	***I***	***S***	***R***	***E***	***V***	***N***	***I***	***E***	***E***
R	W	***L***	***L***	***I***	***H***	***C***	***D***	***N***	***I***	***W***	V	P	C	B	E	***S***	***R***
S	S	Z	L	A	M	R	E	H	T	W	***H***	***U***	***M***	***I***	***D***	***S***	***C***
M	O	J	K	Z	I	D	J	E	F	F	P	W	Z	P	Z	***U***	***A***
K	C	***M***	***A***	***E***	***R***	***T***	***S***	***T***	***E***	***J***	Q	F	Z	A	F	***R***	***S***
P	Y	F	Y	V	M	G	J	T	S	N	W	X	P	C	G	***E***	***T***
R	V	X	K	X	H	E	C	N	E	L	U	B	R	U	T	H	D
M	W	***T***	***S***	***R***	***U***	***B***	***N***	***W***	***O***	***D***	Y	I	D	***O***	***R***	***E***	***Z***
T	***R***	***O***	***U***	***G***	***H***	T	S	O	R	F	A	M	R	E	P	D	D
X	S	F	P	***S***	***U***	***T***	***A***	***R***	***T***	***S***	***O***	***B***	***M***	***I***	***N***	T	J
E	***N***	***O***	***I***	***T***	***A***	***R***	***O***	***P***	***A***	***V***	***E***	N	R	G	L	X	U

Adelaide (West Terrace / Ngayirdapira), South Australia
January 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	Fr	15.0	30.7	0			ESE	35	23:30	22.8	50		WSW	6	1014.3	27.9	29		SW	17	1011.1
2	Sa	18.0	25.3	0			SW	41	16:02	20.6	65		SW	7	1010.6	23.5	52		SW	20	1009.4
3	Su	17.1	26.1	0			S	39	17:48	19.4	54		SSW	4	1010.1	22.4	55		WSW	15	1008.4
4	Mo	16.7	21.4	0			ESE	44	07:26	19.6	56		SE	11	1012.8	19.8	55		SSE	17	1013.1
5	Tu	13.8	22.4	0			S	41	12:57	16.8	53		SSE	17	1017.8	21.2	39		S	20	1016.8
6	We	14.6	23.6	0			S	41	16:05	16.0	63		SE	15	1023.0	22.3	35		SSE	17	1020.6
7	Th	14.1	27.4	0			ESE	31	02:03	17.5	56		SSE	9	1023.6	26.4	31		S	11	1019.8
8	Fr	17.1	33.3	0			E	37	02:41	24.1	48		SW	7	1021.6	29.8	34		WSW	19	1018.7
9	Sa	19.7	34.8	0			SE	35	21:45	25.7	39			Calm	1018.7	32.3	25		SW	17	1016.1
10	Su	22.3	37.3	0			E	39	01:53	30.6	27		NNE	11	1016.4	35.8	17		SW	15	1012.8
11	Mo	27.5	38.3	0			NNW	46	11:04	31.4	20		NNE	17	1008.6	35.2	19		WSW	22	1007.9
12	Tu	15.6	31.2	0			SSE	37	00:12	18.4	53		SE	13	1017.3	28.4	26		ENE	7	1013.4
13	We	15.4	28.3	0			SW	39	17:00	20.8	46			Calm	1012.3	25.6	46		W	19	1012.9
14	Th	12.2	22.7	0.4			SW	44	15:10	17.6	62		SSW	15	1018.2	21.8	42		SW	22	1016.7
15	Fr	14.2	21.3	0.2			SW	50	14:38	16.4	56		SSW	15	1016.7	19.7	34		SW	28	1017.5
16	Sa	14.3	22.2	0			WSW	44	12:19	16.4	49		S	13	1021.1	20.4	46		SW	26	1019.7
17	Su	13.8	23.8	0			SSW	33	13:57	18.5	64		S	11	1022.3	21.6	58		SW	17	1020.7
18	Mo	13.0	25.0	0			SW	43	16:14	17.3	60		SSE	11	1022.2	23.1	50		SW	24	1020.1
19	Tu	13.0	28.6	0			SE	28	16:51	17.3	63			Calm	1023.8	27.4	28		SSE	9	1020.1
20	We	15.4	31.6	0			E	28	01:48	23.3	28		WNW	2	1020.2	30.0	19		WSW	17	1016.5
21	Th	15.1	34.1	0			SW	30	17:37	24.9	24			Calm	1013.3	33.0	14		SW	13	1010.4
22	Fr	15.1	31.4	0			SW	31	15:37	23.3	40		NNE	6	1011.6	29.3	19		WSW	20	1010.5
23	Sa	16.6	39.0	0			E	39	21:57	27.4	18			Calm	1010.2	38.2	9		WSW	17	1007.7
24	Su	27.0	42.7	0			WNW	43	12:16	34.1	13		NE	15	1005.3	41.0	9		WNW	24	1002.1
25	Mo	24.0	34.0	0.2			NE	41	09:32	29.1	35		E	11	998.5	22.7	81		SSE	7	999.6
26	Tu	18.0	24.1	29.8			SSW	37	13:18	18.8	74		SSE	13	1005.9	21.7	54		S	13	1007.1
27	We	15.3	27.5	0			ESE	37	01:10	17.5	55		SE	7	1012.8	25.7	36		E	13	1010.7
28	Th	17.5	30.6	0			SW	35	16:50	24.5	32		ENE	11	1011.1	28.1	25		SW	13	1009.3
29	Fr	18.0	25.5	0			WSW	35	11:36	22.4	51		N	4	1009.4	24.3	53		SW	17	1009.8
30	Sa	15.7	25.5	0			W	52	13:12	18.7	59		SSE	13	1015.3	24.1	45		SW	20	1014.3
31	Su	12.8	27.4	0			WSW	30	13:38	18.9	56		E	11	1017.8	24.7	46		WSW	17	1014.3
Statistics for January 2021																					
Mean		16.7	28.9							21.6	47			8	1014.9	26.7	36			17	1013.2
Lowest		12.2	21.3							16.0	13			Calm	998.5	19.7	9		#	7	999.6
Highest		27.5	42.7	29.8			W	52		34.1	74		#	17	1023.8	41.0	81		SW	28	1020.7
Total				30.6																	

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.

Greater Adelaide in January 2021: heavy rain at times, generally mild temperatures

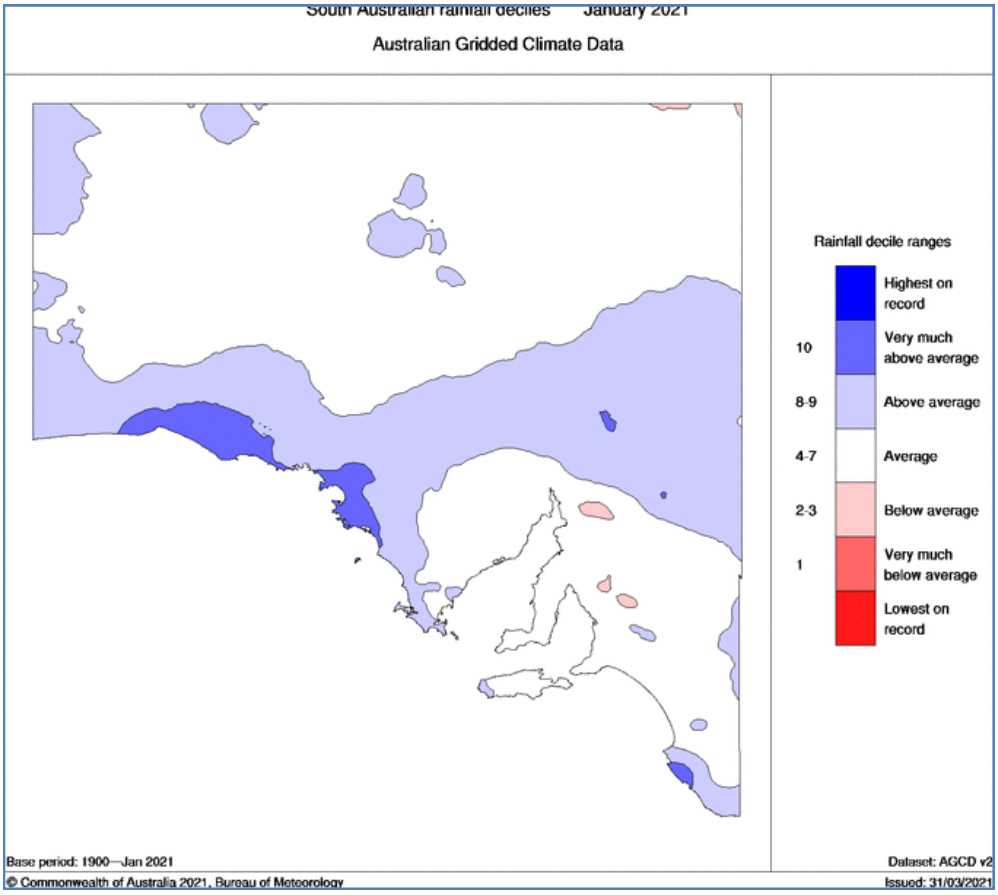
Rainfall in January was above average at most sites across Adelaide and the Hills due to a single heavy rain event that crossed the city on the afternoon of the 25th. Daytime and night-time temperatures were generally cool to mild, but there were two hot spells during January that resulted in dangerous fire weather conditions.

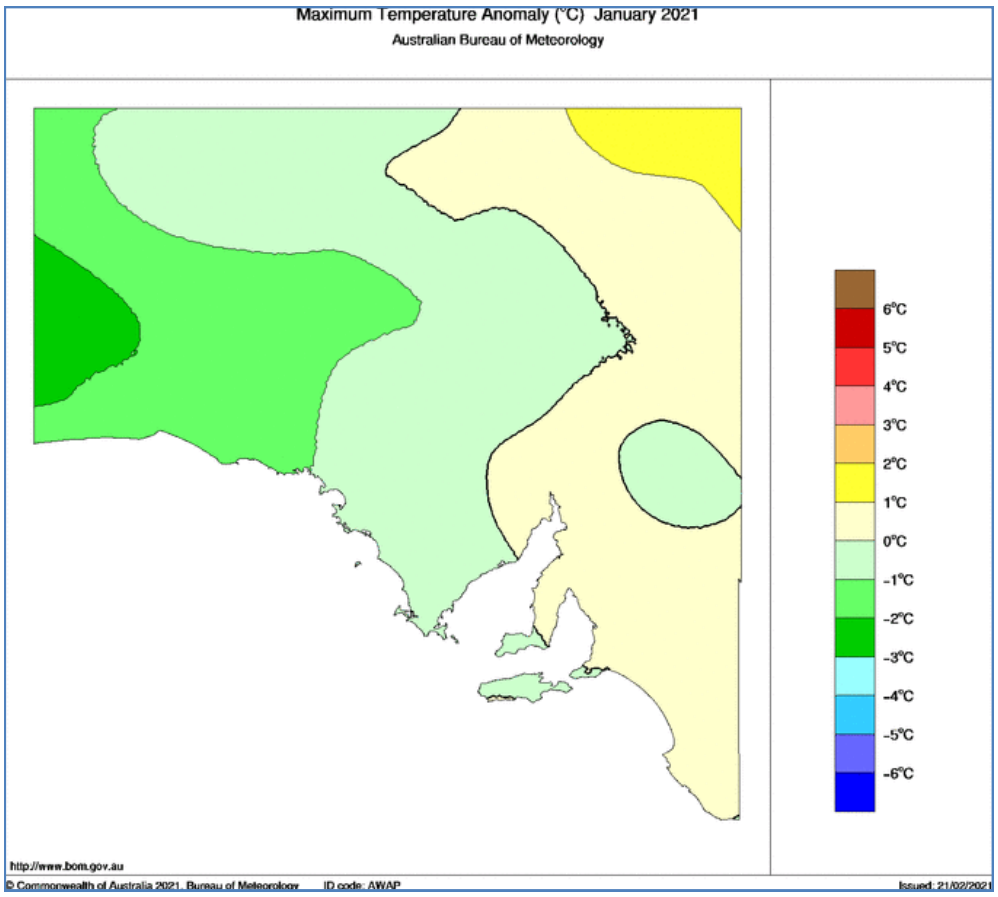
For more information plus a summary of October's statistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202101.adelaide.shtml

South Australia in January 2021: heavy rain at times, generally mild temperatures

Rainfall totals for January were close to average across large areas of South Australia, but it was a wetter than average month for parts of the West Coast and across southern areas of the Pastoral districts. There were widespread heavy falls later in the month, particularly on the 25th. Mean maximum and minimum temperatures for January were generally close to average across most of South Australia, though days were cooler than average in parts of the west.

For more information plus a summary of October'sstatistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202101.summary.shtml





Adelaide (West Terrace / Ngayirdapira), South Australia
February 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	Mo	17.6	25.6	0			SW	46	13:25	19.2	57		S	7	1014.7	24.4	38		SSW	22	1013.9
2	Tu	13.2	24.5	0			S	37	13:58	18.1	56		SSE	11	1019.2	23.7	33		S	20	1017.0
3	We	13.0	28.6	0			W	26	13:02	18.6	52		N	6	1014.3	26.1	31		WSW	13	1009.2
4	Th	18.3	24.6	0			WNW	43	10:04	23.4	37		NE	9	1000.5	19.1	73		NNE	17	998.9
5	Fr	12.8	19.4	15.6			NW	61	15:03	16.0	61		N	24	999.1	18.5	73		NNW	30	994.5
6	Sa	15.1	20.4	8.6			W	52	23:51	17.1	92		WSW	17	1004.6	19.6	74		WSW	24	1007.4
7	Su	15.6	21.2	1.6						17.2	70		S	7	1015.0	20.5	52		SW	6	1014.2
8	Mo	13.0	25.7				SSE	33	14:26	16.5	54		ESE	9	1016.0	24.2	36		SE	13	1014.1
9	Tu	16.3	30.5	0			ENE	35	02:34	20.7	45		NE	9	1013.7	29.1	25		NE	9	1011.5
10	We	15.7	35.0	0			E	24	21:40	23.4	37			Calm	1010.9	34.3	13		SW	11	1008.2
11	Th	21.0	35.4	0			NW	44	12:04	28.4	32		N	2	1002.5	34.1	26		WNW	19	1001.5
12	Fr	16.0	22.6	0			SSW	35	12:28	18.0	64		SW	7	1009.4	21.7	47		WSW	19	1009.9
13	Sa	14.5	23.5	0			SW	37	17:15	19.1	65		S	9	1016.2	22.2	51		SW	19	1016.3
14	Su	12.3	26.3	0			SE	31	16:10	18.1	59		E	6	1019.3	25.5	35		SSE	15	1017.2
15	Mo	13.3	30.5	0			WSW	28	12:41	19.7	66			Calm	1019.0	25.9	45		WSW	17	1017.0
16	Tu	17.6	34.8	0			SW	30	15:42	22.6	65		NNW	6	1017.1	34.0	22		WSW	17	1014.3
17	We	22.4	37.9	0			S	30	17:45	29.5	27		NE	13	1016.5	36.1	18		WSW	19	1014.0
18	Th	26.9	36.9	0			N	39	09:59	30.0	26		NNE	13	1016.1	35.8	17		NE	15	1012.2
19	Fr	26.6	36.7	0			NE	33	23:41	30.3	26		NNE	13	1011.0	34.6	20		W	15	1009.9
20	Sa	18.6	30.6	0			S	31	17:04	22.1	55			Calm	1013.0	28.6	45		WSW	13	1010.6
21	Su	15.1	22.9	0			SW	46	15:15	18.6	59		S	11	1014.1	21.5	49		SW	24	1013.0
22	Mo	16.1	23.9	0			SW	43	14:57	18.8	56		SSW	15	1016.8	22.8	35		SW	20	1016.7
23	Tu	12.6	22.5	0			SE	35	16:02	16.2	54		ESE	11	1022.4	21.1	29		S	17	1020.8
24	We	13.6	22.2	0			SE	35	03:00	15.9	44		N	4	1021.0	19.9	40		SW	20	1017.8
25	Th	10.7	21.5	0			WSW	39	14:53	16.8	57		SSE	4	1016.7	20.8	47		SW	19	1015.0
26	Fr	14.1	23.9	0			SW	28	14:35	17.2	64		ESE	13	1015.1	22.6	43		WSW	13	1012.9
27	Sa	11.9	25.9	0			SW	30	18:10	18.5	53		NNE	4	1012.6	23.9	40		WSW	19	1011.3
28	Su	13.2	25.7	0			W	30	14:17	19.4	64			Calm	1012.6	24.1	46		WSW	17	1011.8
Statistics for February 2021																					
Mean		16.0	27.1							20.3	53			8	1013.5	25.5	39			17	1011.8
Lowest		10.7	19.4							15.9	26			Calm	999.1	18.5	13		SW	6	994.5
Highest		26.9	37.9	15.6			NW	61		30.3	92		N	24	1022.4	36.1	74		NNW	30	1020.8
Total				25.8																	

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.

Greater Adelaide in February 2021: wet at times with below average temperatures

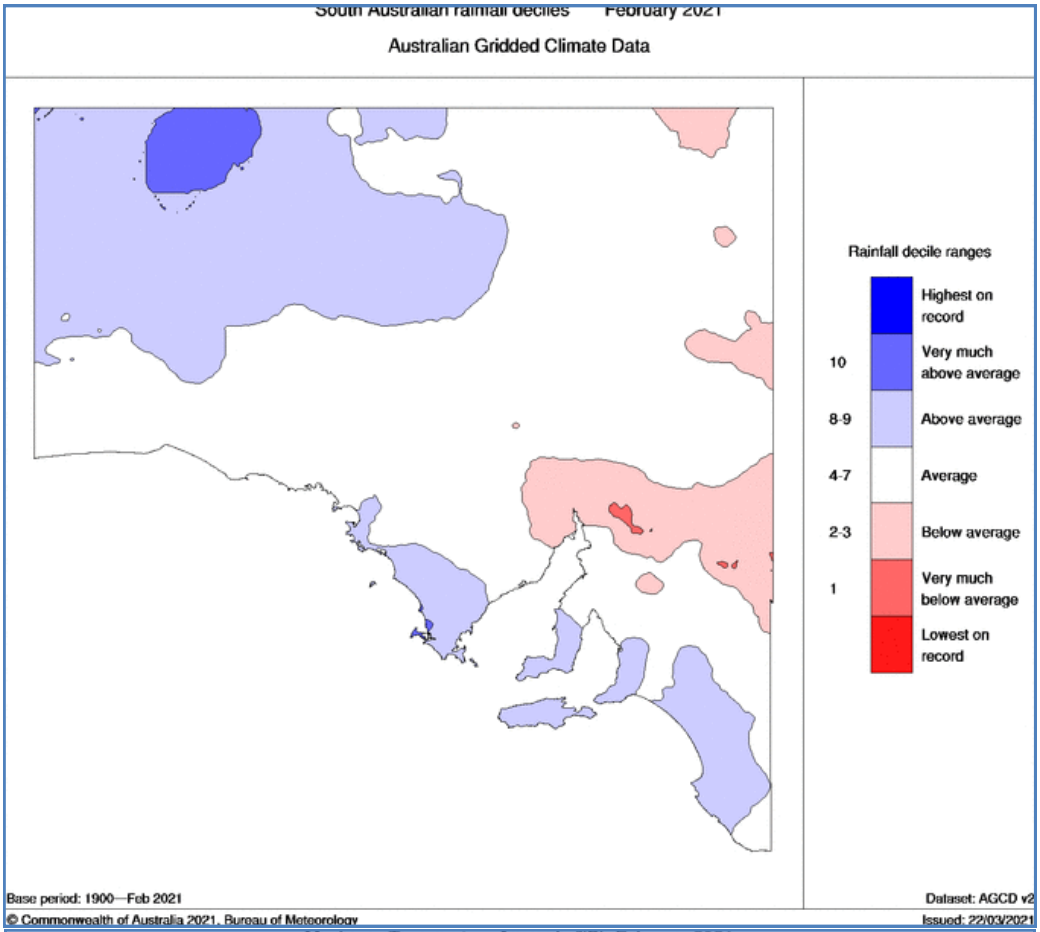
Rainfall in February was above average at most sites across Adelaide and the Hills. Both mean maximum and mean minimum temperatures for February were below average at most sites around Greater Adelaide.

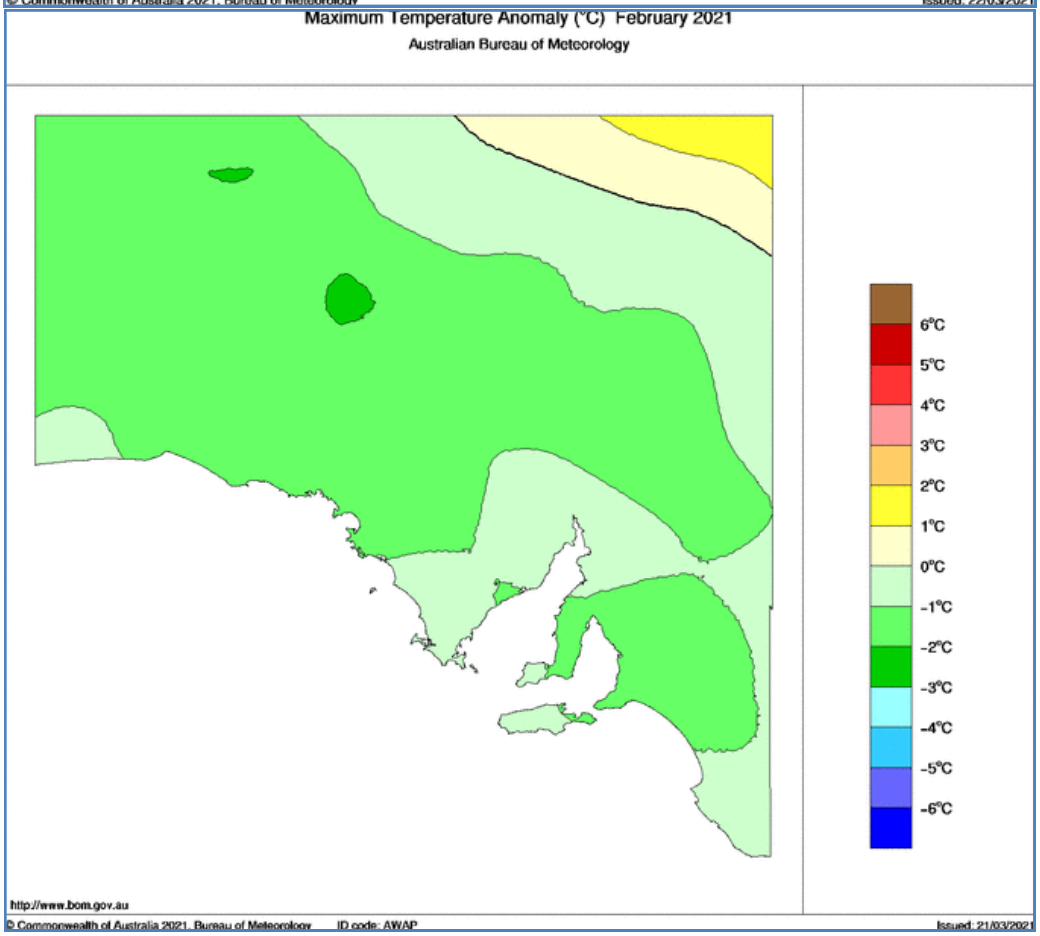
For more information plus a summary of November's statistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202102.adelaide.shtml

South Australia in February 2021: wet in the west, cool days

Rainfall in February was above to very much above average in the Northwest Pastoral district and along the southern coasts, but was below average across parts of the state's east. Both daytime and night-time temperatures were cooler than average across large parts of the state, with below average monthly temperatures extending from from western districts to the Murraylands. It was South Australia's overall coolest February since 2012.

For more information plus a summary of Novembers statistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202102.summary.shtml





Greater Adelaide in summer 2020–21: cooler than average

Rainfall for summer was generally close to average across Adelaide and the Hills, though Kuitpo Forest Reserve had a wetter than average season. Both mean maximum and mean minimum temperatures were less than average at most sites around Greater Adelaide.

For more information plus a summary of Spring's statistics please see:
http://www.bom.gov.au/climate/current/season/sa/archive/202102.adelaide.shtml

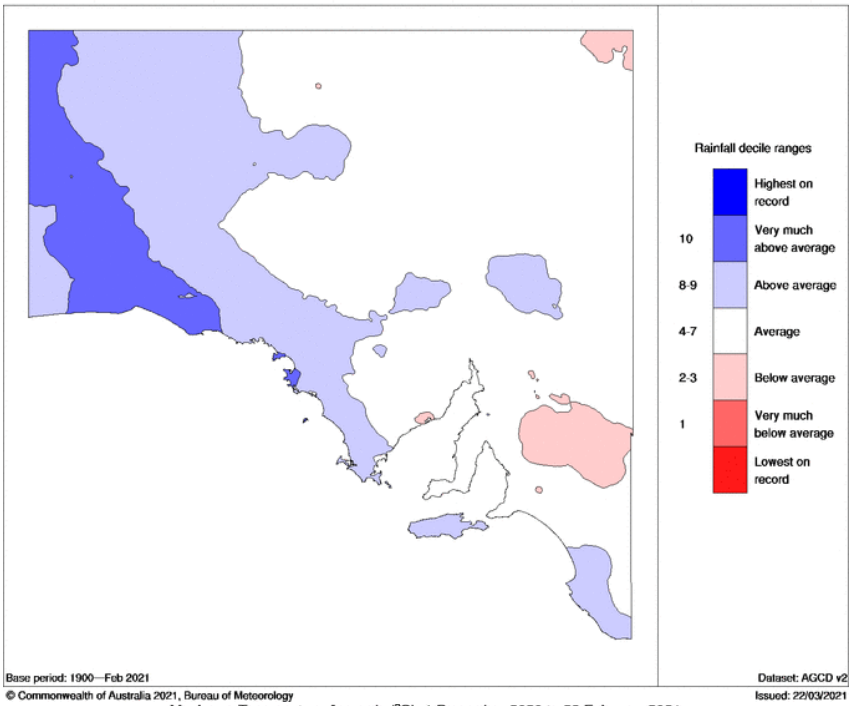
South Australia in summer 2020–21: coolest since 2001–02

Rainfall in summer was above average in South Australia's west and along the southern coasts, but below average in parts of the east. Daytime temperatures for summer were below average across most of South Australia, whereas night-time temperatures were generally close to average in most districts.

For more information plus a summary of Spring's statistics please see:
http://www.bom.gov.au/climate/current/season/sa/archive/202102.summary.shtml

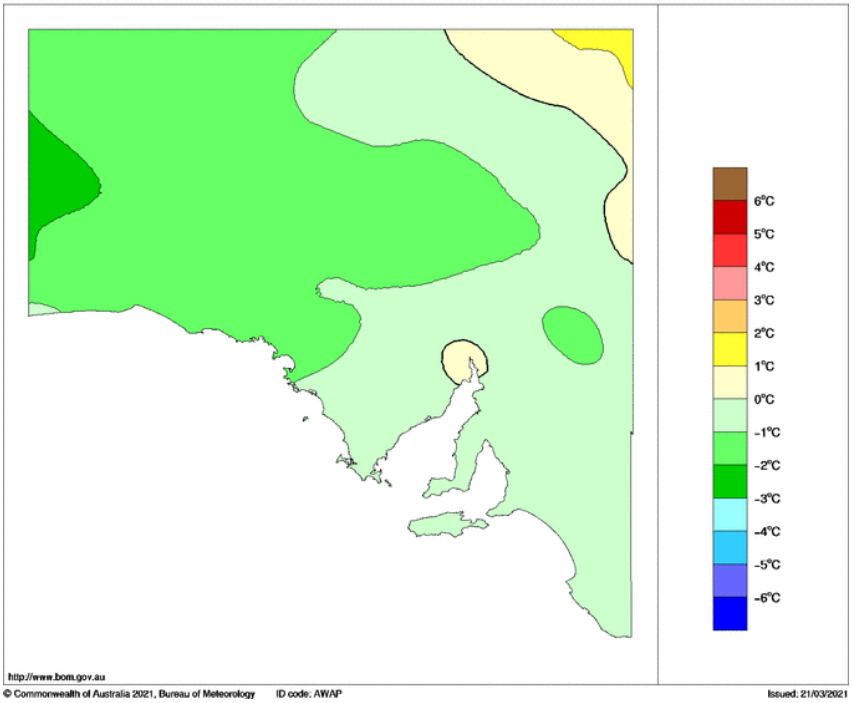
South Australian rainfall deciles 1 December 2020 to 28 February 2021

Australian Gridded Climate Data



Maximum Temperature Anomaly (°C) 1 December 2020 to 28 February 2021

Australian Bureau of Meteorology



Adelaide (West Terrace / Ngayirdapira), South Australia
March 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	Mo	13.4	26.3	0			SSE	35	18:36	17.9	60		NNW	7	1016.0	25.3	37		SE	11	1014.8
2	Tu	12.4	24.6	0			ESE	35	19:06	15.3	46		ESE	11	1019.6	22.7	24		ENE	11	1016.6
3	We	13.7	25.8	0			E	30	02:25	16.9	42		E	13	1020.0	24.8	27		ESE	9	1018.5
4	Th	9.7	24.7	0			WSW	31	15:49	16.0	52		NNW	6	1020.2	23.1	43		WSW	15	1017.4
5	Fr	11.6	27.6	0			SSE	35	16:20	17.3	65		W	7	1016.9	24.2	53		WSW	20	1014.1
6	Sa	12.1	28.3	0			NW	26	11:42	17.4	46		ESE	2	1013.6	25.1	33		WSW	17	1011.0
7	Su	17.2	28.5	0.2			WSW	26	14:19	23.1	33		NNE	4	1008.6	26.9	31		WNW	11	1007.7
8	Mo	16.5	26.4	0			S	31	16:37	18.5	63		SE	13	1012.6	25.3	36		SSE	11	1011.9
9	Tu	11.9	26.6	0			SE	31	17:31	17.1	63		NE	9	1018.3	24.5	42		WSW	15	1016.9
10	We	15.8	26.4	0			E	26	23:59	19.6	52			Calm	1018.3	23.1	51		WSW	11	1016.5
11	Th	14.5	26.7	2.8			WSW	26	14:52	19.0	73			Calm	1017.4	25.8	41		WSW	13	1015.5
12	Fr	14.3	32.5	0.2			NW	30	14:54	19.8	54			Calm	1014.9	31.4	25		NW	17	1011.5
13	Sa	17.9	20.8	1.6			SW	46	14:13	18.0	88		SSW	19	1013.8	19.7	47		SW	22	1016.9
14	Su	9.7	20.6	6.8			WSW	37	14:53	14.8	59		SSE	6	1025.1	18.9	43		WSW	20	1023.9
15	Mo	9.4	21.7							15.6	70		NNW	4	1026.7	19.9	62		SSW	13	1025.0
16	Tu	14.4	23.7	0			W	20	11:59	18.6	71		W	6	1024.7	22.8	51		W	11	1021.8
17	We	13.7	27.3	0			SSW	31	16:17	19.3	66		NW	4	1021.4	25.9	42		WSW	19	1018.7
18	Th	18.2	30.7	0			ESE	35	11:01	22.8	52			Calm	1021.8	30.1	26		E	15	1020.3
19	Fr	18.7	30.9	0			SE	39	19:11	24.5	42		E	11	1023.6	29.1	30		E	24	1020.3
20	Sa	20.3	32.6	0			SE	39	12:45	25.3	43		NE	7	1021.8	31.3	26		ESE	15	1018.1
21	Su	21.0	30.4	0			ENE	31	04:06	24.6	42		NE	17	1018.1	28.9	36		SW	13	1015.3
22	Mo	16.7	28.9	0			SW	30	15:15	21.8	57			Calm	1014.0	28.0	35		SW	15	1010.6
23	Tu	13.7	23.9	0			SW	33	14:47	18.8	55		N	2	1009.4	22.9	51		SW	17	1007.7
24	We	17.0	22.8	0			WSW	35	20:55	18.0	74		SW	15	1009.1	20.8	58		WSW	20	1008.8
25	Th	16.1	22.0	0			SW	33	01:00	17.6	62		SW	19	1012.1	21.5	43		SSW	15	1012.3
26	Fr	13.3	22.9	0			N	24	11:25	15.6	68		NE	11	1012.7	22.1	46		WNW	17	1010.5
27	Sa	13.5	21.3	0.4			SW	30	14:33	17.8	65		E	4	1014.9	20.5	47		SW	17	1015.4
28	Su	12.3	21.6	1.2			SW	26	13:29	15.5	73		N	9	1021.5	20.7	53		SW	15	1020.7
29	Mo	10.7	23.9	0			SW	30	16:48	16.3	72			Calm	1025.4	22.7	51		WSW	13	1023.8
30	Tu	13.5	27.1	0			WSW	30	15:31	18.5	65			Calm	1026.4	24.7	38		WSW	13	1024.5
31	We	13.5	28.0	0			WSW	24	12:05	20.5	48		E	7	1024.5	26.9	35		WSW	13	1021.8
Statistics for March 2021																					
Mean		14.4	26.0							18.8	58			6	1018.2	24.5	40			15	1016.4
Lowest		9.4	20.6							14.8	33			Calm	1008.6	18.9	24		ESE	9	1007.7
Highest		21.0	32.6	6.8			SW	46		25.3	88		#	19	1026.7	31.4	62		E	24	1025.0
Total				13.2																	

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.

IDCJDW5081.202103 Prepared at 13:03 UTC on 2 Apr 2021

Greater Adelaide in March 2021: drier than average with mostly cool to mild days

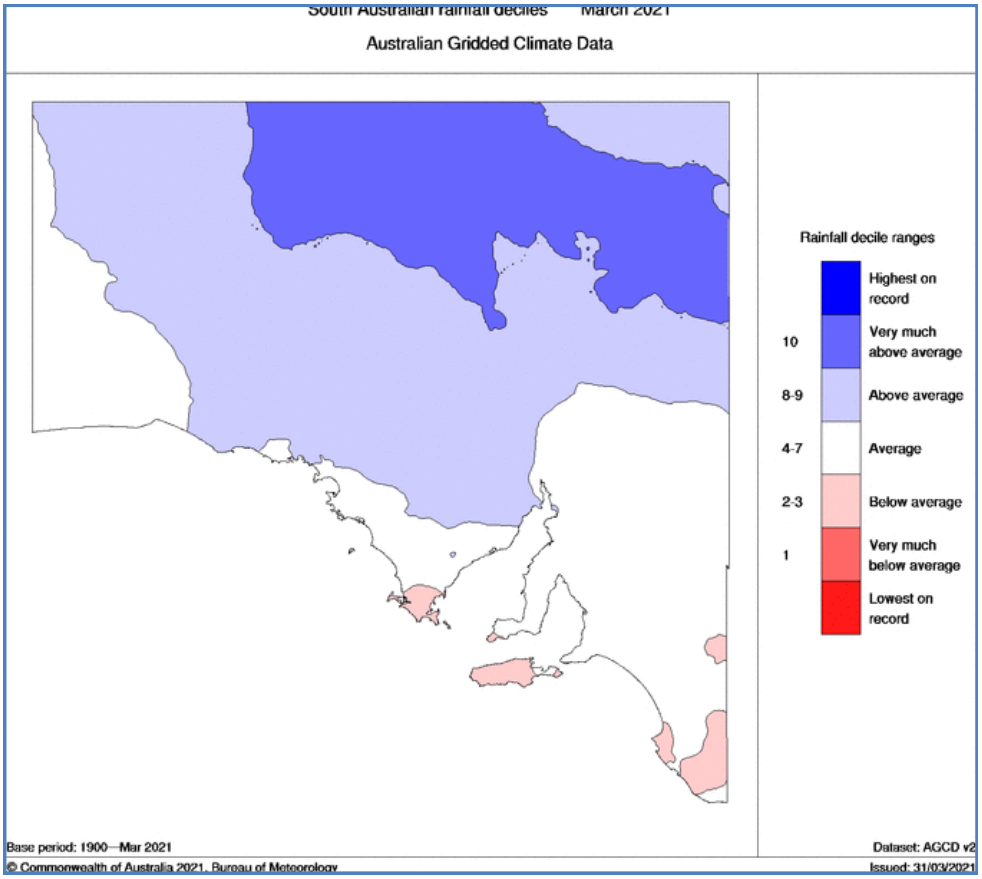
Rainfall in March was generally less than average at most sites across Adelaide and the Hills, with totals closer to average along the southern beaches. Both mean maximum and mean minimum temperatures were near-average or below average at most sites across Adelaide and the Hills.

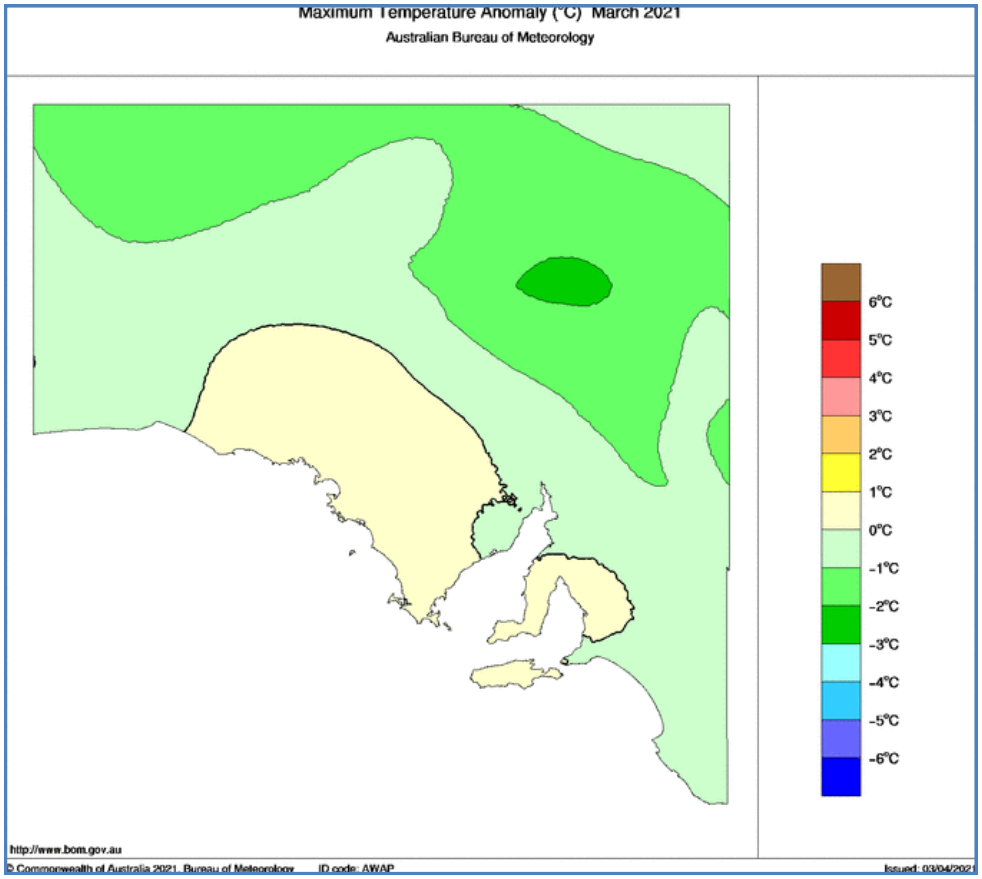
For more information plus a summary of December's statistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202103.adelaide.shtml

South Australia in March 2021: wet in the north, cool days

Rainfall in March was above to very much above average in the northern Pastoral districts, but totals were close to average or below average in many southern areas of the state. Overall, it was the state's wettest March since 2016. Daytime temperatures were below average in the north, but closer to average in the south. The mean maximum temperature for South Australia as a whole was the lowest in March since 2012. Night-time temperatures were generally cooler than average in the east, but near -average or warmer than average in the west.

For more information plus a summary of December's statistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202103.summary.shtml





NEXT MEETING

7.00 PM TUESDAY 20 April 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.au/e/weather-and-climate-forecasting-whats-changing-tickets-149998418307?aff=ebdssbeac&keep_tld=1

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 and Climate Forecasting - What's Changing

Speaker: Paul Lainio, Manager Media and Community Relations, Adelaide Office, Bureau of Meteorology.

Our speaker, Paul Lainio is the popular and recognised face of the South Australian Weather Bureau. He will outline how short-term weather, and longer range seasonal and climate services are changing with advances in data access, radar, and atmospheric modelling.

Many will be astonished to realise that the first next day temperature forecast in Australia only occurred in the lifetime of many current citizens! Before that the forecast was general in nature, "tomorrow will be fine, cold to cool, light variable winds". It was only 15 years ago that the Bureau commenced 7 day temperature forecasts and the estimation of rainfall amounts. We can now examine over the web, detailed maps of rain and temperature for the whole continent for the next three months. The forecasting horizon has gone from 7 to 90 days!

Paul has worked with the Bureau during this time of rapid changes. His easy speaking style and his depth of knowledge creates an opportunity not to be missed. With COVID restrictions, seats are limited, so please book now..

MEMBERSHIP FEES WAIVED FOR YEAR 2020 - 2021

For further information about AMETA & meeting details please contact:

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