Australian Meteorological Association Inc

Monana

THE OFFICIAL PUBLICATION OF THE AUSTRALIAN METEOROLOGICAL ASSOCIATION INC
August 2021

From the President's Pen

by Mark Little

The upcoming membership year 2021-2022 will be a critical year for your Association. Not surprisingly, the threat of COVID restrictions still hangs in the air, as the Association attempts to come back to some normal meetings.

Several Committee members have reflected on their other interests and decided that it is time to devote more time to those activities. Well done to those departing Committee members, good luck with their other endeavours and I'm sure we will all be interested to hear how they go.

Due to personal circumstances, during the last Committee term, we lost the Treasurer and the Secretary – thanks for their efforts in their time on Committee.

Unfortunately however, this resulted in me being President, Treasurer and Secretary. I was in a similar situation with another club in the past, but a medical event showed the chaos that occurs when a person is doing too many jobs and that person must stop suddenly. Since it appears to be easier to get a President than a Treasurer, I am nominating for Treasurer, but not the President at the AGM.

These vacancies mean that it is time for the other members of this Association to step up to fill the gaps that will be created by Committee Members who step down. If people don't step up, the AMetA cannot continue.

You may feel that you do not know enough to contribute to the running of the Association, but you would be wrong. Everyone starts not knowing much about any activity. Even if you know everything today, you will not know everything by the following morning. What you need to be effective on the Committee is a willingness to contribute, and a willingness to learn. Everyone on the Committee is willing to help anyone who is new to being on a committee.

Hopefully by the time of the AGM, any COVID outbreaks will be under control and it will be possible to have a physical meeting. As always, if the meeting goes ahead, it will be up to each member to consult with their health professionals if there is any doubt that they should be attending.

An interesting outcome of advertising the AMetA meetings on Eventbrite is that people from interstate have been in contact wanting the AMetA to publish a video of the meeting on YouTube or similar. While it is an appealing concept it would take a lot of effort to setup and run, without the target audience having to contribute to the cost of having the meeting. For a small group like the AMetA, it is probably not a practical proposition at this stage.

On a final note, the AMetA is **YOUR** association, and **YOU** are the only people who can keep it running and provide ideas to make it more relevant in these uncertain times. I hope to see you on the Committee.

Happy, Keep Safe

Mark Little President, Australian Meteorological Association

Bushfires and Atmospheric Interaction: Learnings from Black Summer 2019-20 By Beth Walton

At the June AMetA meeting, Dr Mika Peace (at right, second from left), from the Bureau of Meteorology and currently Lead Researcher in the Australian Bushfires and Natural Hazards Cooperative Research Centre (CRC) shared some of her Group's research into bushfire behaviour. This Group, based in Adelaide is at the leading edge globally, of bushfire modelling capability. Critical input data (soil moisture, fuel load and meteorological conditions) for their recent modelling work have been drawn from some of the most devastating and difficult to control fires (including those on Kangaroo Island) which occurred during Australia's Black Summer 2019-20. The **ACCESS[1] - Fire** numerical model was used to simulate the fires under varying scenarios.

The bushfire toll during Black Summer included:

- 18 million hectares burned (with the Gospers, NSW Fire, covering 500,000 hectares - the largest fire from a single ignition)
- about 3 billion animals killed or displaced
- more than 3,000 homes destroyed (many more saved)
- 35 fatalities directly related to the fires; with approximately a further 450 fatalities attributed to smoke.

Significant findings and successes of the Modelling

Some of the most significant findings (either observed 'on-ground' or derived from the ACCESS modelling) were:

- Hazard reduction burning during a fire (to reduce the impact of wind change) was not necessarily as effective as anticipated
- Most fires began under heatwave conditions with anomalously warm overnight temperatures. This inhibited overnight fuel moisture recovery - hampering fire suppression.
- The Yanchep Fire (on the west coast north of Perth), burning under a prevailing hot, dry easterly wind stream was prolonged by warm overnight temperatures and local south-westerly daytime sea-breezes enabling the fire to spread to the north and impacting an unexpectedly large area.
- In the Badja Forest Fire, NSW:
  - The Forest Fire Danger Index (a bushfire index developed in the mid 20th century and once, typically expected to peak in the daytime) reached catastrophic levels overnight, as a low level jet, strengthened by the fire dynamics, descended to ground level
  - A vortex (tornado like feature) was also generated overnight in this fire.
  - A fire generated vortex with tornado strength winds and other rotating convection columns (of smoke) were also observed in the Corryong Fire, Victoria. ACCESS-Fire depicted strong vorticity in the region of this vortex and extreme low level winds adjacent to the fire front (consistent with damage observations) were also successfully modelled.

[1]**ACCESS** is the Australian Community Climate-Earth System Simulator a numerical prediction model jointly developed by the Bureau of Meteorology, CSIRO and the Australian university community. For more information see www.bom.gov.au.

The Kangaroo Island Fires

Numerous fires, mostly ignited through lightning between 20 December and 6 February burnt 211,000 ha - around half the area of the island. There were 2 fatalities.

The most devastating and difficult to control was the Ravine Fire, Flinders Chase, which was ignited on the north coast of the Island by lightning on 30 December. On 3 January it broke its containment and spread to the southwest coast by evening (See Fig 1).

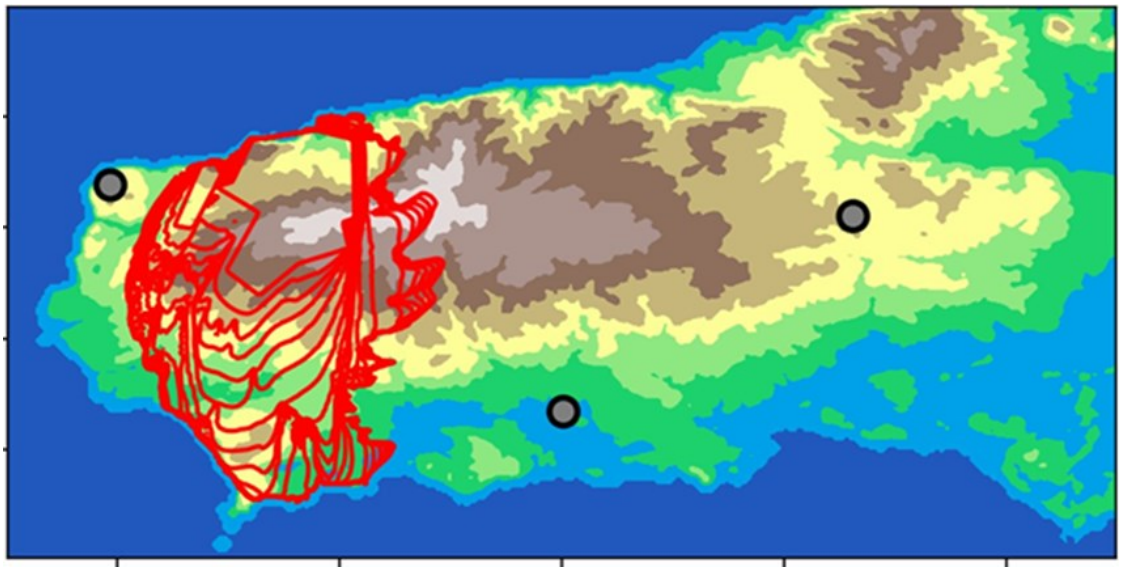


Fig 1. Modelled hourly isochrones showing the spread of the Ravine Fire during the day, 3 January 2020, under the influence of a northerly wind stream. Cape De Couedic, which escaped the fire is on the promontory in the lower left corner. Parndana, situated roughly in the centre of the Island, is located just west of the eastern-most black encircled location marker.

The Mean Sea Level (MSL) pressure analyses for 11.00am and 11.00pm, in Fig 2, show a cold front moving across the Island with northerly winds ahead and south westerlies behind. The gale force south-westerlies (50-60km/hr) with gusts to 80 km/hr moved the fire front to its extensive eastern flank around 6.00pm, causing it to spread rapidly towards the centre of the island. For a period around dawn it threatened the town of Parndana.

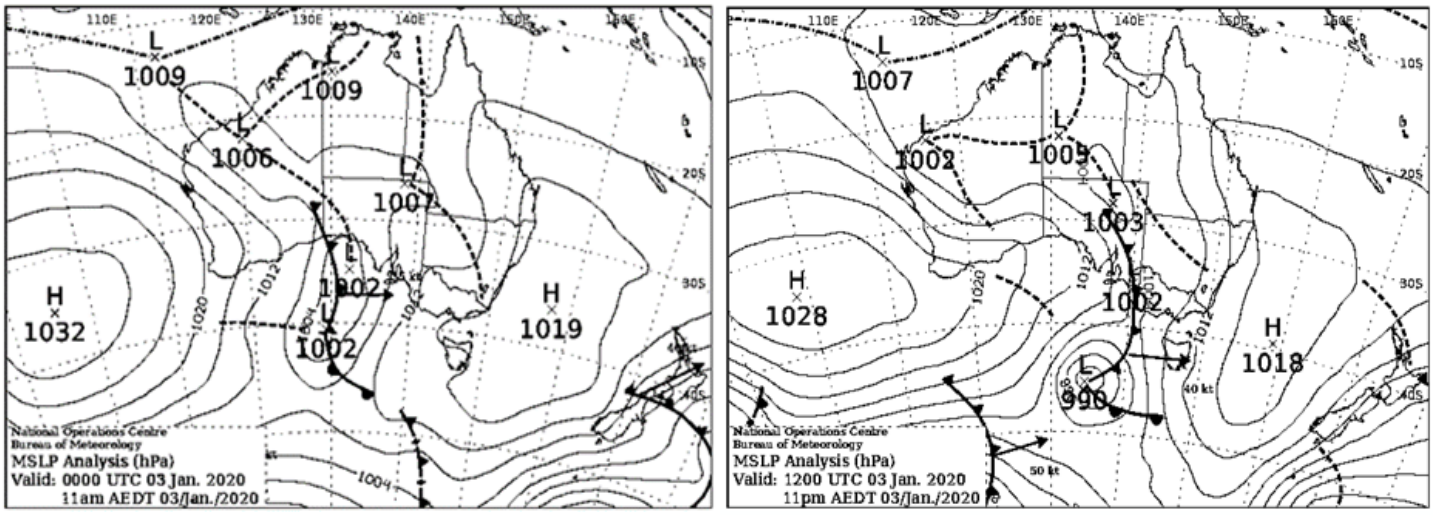


Fig 2: the MSL pressure analysis for 11am and 11pm 3 January 2020 showing the movement of a cold front across Kangaroo Island and the resultant change in wind direction.

Conclusions

The modelling work has shown ACCESS-Fire is a reliable tool for examining fire behaviour in complex terrain and in coastal areas where local effects can interact with the prevailing wind. In the case of the Ravine Fire, while the fire spread to the southwest coast, it did not extend on to the small promontory of Cape De Couedic; both the lighthouse and surrounding cottages were spared. The modelled isochrones in Fig 1 successfully capture this. As with the Yanchep Fire, local sea-breezes impacted the spread of the fire. In the Corryong Fire, modelling indicated vorticity in the region of an observed vortex and extreme low level winds adjacent to the fire front were successfully modelled.

In concluding Mika noted that fire behaviour forecasts are only one input to the decision making process of emergency managers. Priorities are on minimising the adverse impact on life and property, being aware of 'worst case scenarios' and avoiding surprises.

Public warnings need to communicate the risk to communities which are not homogenous, ***i.e.*** the level of risk, the impacts and mitigating action will be different for different sectors and individuals. Meteorological input can assist with decision support in these circumstances.

Fire conditions can change rapidly requiring quick adaptive responses which draw on expertise from a range of agencies. This requires cohesive teamwork, with trust built up between the individual team members. Ongoing collaboration between different agencies is an essential component of bushfire management.

The PWS Group Eventually Starts (Then Stops)

By Mark Little

In early 2020, the AMetA's Personal Weather Station (PWS) Group was about to start, when everything came to a screeching halt due to the COVID-19 pandemic.

Fast forward to mid-2021 past the lockdowns and it was time to try again to start the PWS Group. This time the PWS Group had two meetings at the Port Adelaide Enfield Council's IoT Experimenters Meetings before a COVID outbreak reared its ugly head and put those meetings in jeopardy.

Still, those two meetings have been enough to kick the group off, albeit with only three AMetA participants at this stage. Between those three members, there are currently two projects running. The first project is being carried out by Jon—an electronic rain gauge whose readings will be logged and uploaded to the Internet. The second project being carried out by Mark and Dave involves developing networked air-quality monitors using the EPA recommended Plantower PMS5003 sensor.

The image to the left shows the current operational prototype air quality sensor device (centre-front), three additional prototype air quality sensor devices under construction and some Raspberry Pi computers.

The hardware mounted on the white plastic bases is the sensor and its controlling Arduino-clone. For those with an eagle-eye, the white plastic bases were discussed in the article "Simplify Weather Station Building with a 3D Printer" in the March 2020 edition of the *Monana* magazine.

The green units on the left-hand side of the image are the Raspberry single board computers. The screen at the rear right is an touch-screen LCD display that has the latest model of Raspberry Pi mounted at the rear.

The box on which the hardware is sitting is a 3D printer that was used to print the white bases used for mounting the air quality sensors.

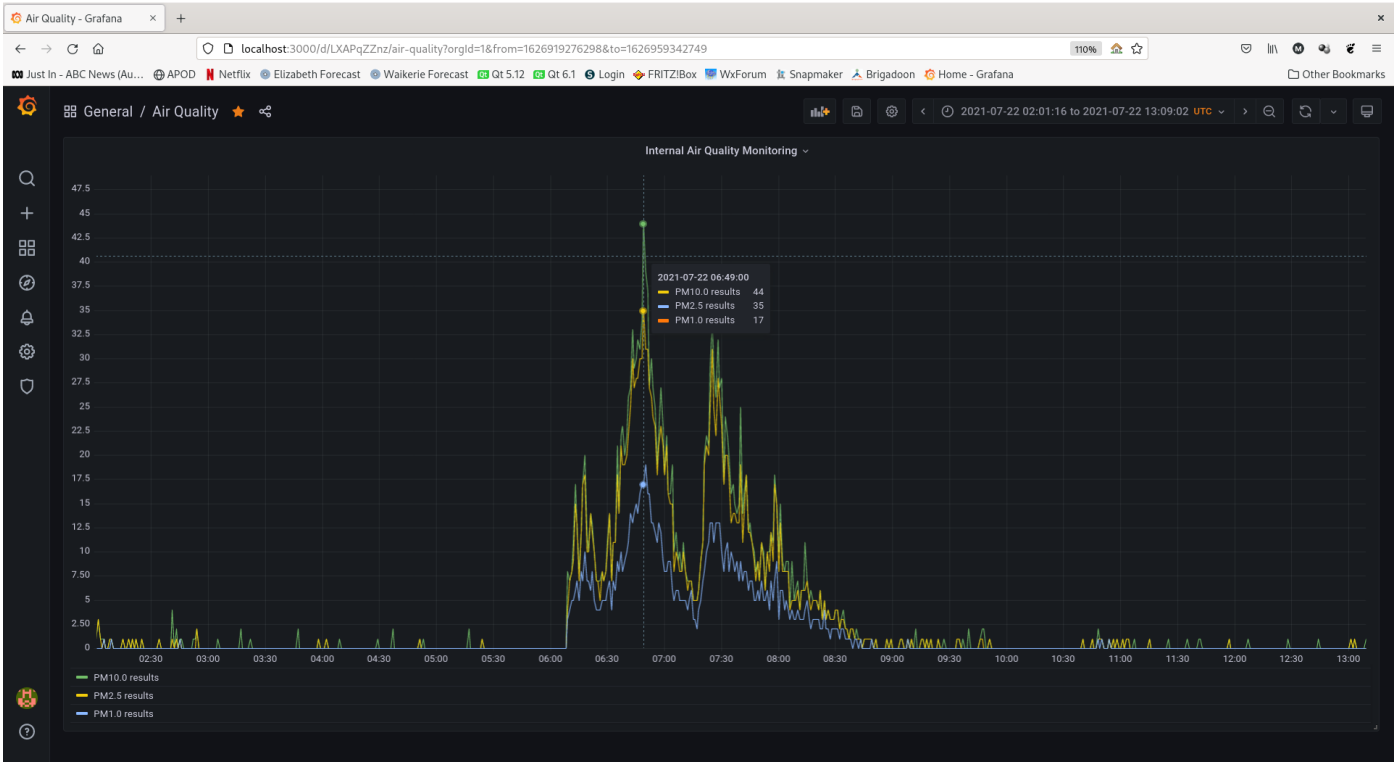
Luckily, except for the air quality sensors and the 3D printing filament, the other equipment has been recovered from previous projects that are no longer in use. So that this requirement remains re-useable, I try to refrain from maiming modification in the early development stages, in case I change my mind and end up using the item

elsewhere.

The project's initial stage is to build four (4) air quality sensors each controlled by an Arduino Clone. These sensor systems will initially be connected to a single computer by USB and the results from the sensors will be recorded. With the sensors placed next to each other, the results from the four (4) units will be compared to confirm that the air quality readings are repeatable across a range of sensors. While this is not the same as calibrating each sensor, it does allow detection of comparative changes in air quality with confidence.

Once this comparative testing has been completed, each sensor will be connected to a separate computer (Raspberry Pi), put in different locations around a locality and connected to a central computer. Once the software is (partially) working, the sensors will be spread out to a number of sites around Adelaide and the software development completed.

When the software is completed, it will be time for one of the hardest parts of the project—designing and building a weather shield that allows the sensor to sample the atmosphere, but also isolate it from inclement weather such as rain. Unfortunately, the 3D filament I have is no good for a weather shield because it is PLA (Polylactic Acid) which is made from sugarcane or corn starch. This material is not UV stabilised and eventually breaks down when used outside. Not only that, because it is a thermal plastic, it weakens in high temperatures and the structure can start to deform in the hot



summer sun if it is under a load.

The above image shows the internal air-quality recoded from the first prototype air-quality sensor whose readings are being recorded into a MariaDB database and displayed using the Grafana data display program. Although the details of the graph are a bit difficult to see, the horizontal axis is time and the vertical axis is the PM number of the readings (PM1.0, PM2.5 and PM10.0) - where 'PM number' is the particulate matter concentration.

The time axis runs from about 02:30 to 13:00 UTC and the reading around 0 most of the time except a couple of peaks either side of about 07:15 UTC. The air quality sensor was located 1200 mm from a soldering iron. The start of each peak is the start of a soldering session . After the session ends, the particulate counts begin to drop off. This cycle is repeated when a second batch of soldering is carried out. After the last of the soldering, the particulate count dies away until it reaches the normal background level.

Now it is a matter of waiting for the additional three (3) air quality sensors to be delivered before the remaining three sensor devices can be completed and tested.

A high resolution barometer can be included in the prototype, but only one has been installed at this stage, since there seems little point in measuring the air pressure five (5) times. Once in the local PWS and four in the air quality sensors. However, later when the air quality sensors are located in different positions, it may be interesting to get high resolution atmospheric pressure readings from around Adelaide.

Once the sensors are separated so they aren't on the same home network, the data from the air quality sensors will be sent via the Internet in the same way that Personal Weather Stations upload data to sites such as Weather Underground and WOW.

If you are interested in the air quality monitor project, don't hesitate to contact Mark for more details. It would be great to hear from people with an interest in the electronics and programming, but it would be even better to hear from someone who has the skills and tools to make suitable enclosures for the air quality monitors. Even if you aren't into electronics, computers or mechanical design, it would still be nice to hear from you if you would like to get involved.

Just as a bit of amusement with a true story. I was walking the dog this afternoon and as I crossed the railway line, a woman coming the other way across the crossing said "Will you marry me?" I was caught a bit off-guard and thought that I must have heard her incorrectly when she distinctly said again "Will you marry me?"

To say the least, I was rather gobsmacked and just looked at her. It was then she realised I was staring at her and said "Hello", then kept walking. It was only when she had passed that I realised that she was handsfree on her phone explaining English to someone when she continued with "No, no. It's like 'Will you put out the rubbish?' or 'Will you take out the rubbish?'".

Good thing I didn't answer her the first time I heard her speak.☺

St Peter's College High Altitude Balloon Release.

Contributed by Beth Walton

Check out the link below and read about the balloon experiment conducted by St Peter's science students earlier in the year. The students learnt a lot from it, from the straightforward physics, to data management and coding to remove spurious data. One of the boys even had to learn how to use a sewing machine to sew a parachute, and then how to test it to meet the required specifications!

https://www.stpeters.sa.edu.au/news/high-altitude-balloon-01-04-21/

Please Note: Several images used in this magazine are from external sources and many are acknowledged via a hyperlink to the source of the image. Click the image to visit its source. ***The AMetA does not have control over the content of linked sites, or the changes that may be made. It is your responsibility to make your own decisions about visiting those sites and determining if that information is suitable for your purposes.***

The Weather and its Impact on History: Number 5

by Dianne Davis

In the previous articles on this subject, I have concentrated on battles where the weather had a decisive impact on the outcome. In this final instalment I have taken a different approach. Although there are some military campaigns listed, I have also included other world events which were significantly affected by the weather

In the website given immediately below, you will find a brief discussion on each of the topics. The 8 that have an asterisk next to them are the ones discussed in more detail in this article. I have also added 2 more topics. These are firstly, "The possible role of climate in the Fall of the Roman Empire" and secondly, "The eruption of Mt Tambora (in Indonesia) in 1815."

I have listed the events in chronological order from earliest to latest.

The website is called ***10 Surprising Ways when Weather has changed World History*** and is to be found at: https://www.livescience.com/11339-weather-changed-history.html

1. Sunshine over Hiroshima*
2. Hitler Invades Russia*
3. Napoleon Invades Russia*
4. A Slave Revolt washed away.
5. Hailstorms speed the Onset of the French Revolution*
6. Washington Lives to Fight another Day*
7. Charles XII (of Sweden) invades Russia*
8. A Protestant wind destroys the Spanish Armada
9. The first Kamikaze*
10. Sea Breezes save Western Culture*

I. SEA BREEZES SAVE WESTERN CULTURE. *or How the Greek Navy defeated the Persians at the battle of Salamis in 480 B.C.*

- https://www.worldhistory.org/Themistocles/9 *in particular the section called "The Battle of Salamis" starting from the sentence "From a certain time of day"*
- https://en.wikipedia.org/wiki/Themistocles in particular the section "Second Persian Invasion of Greece" and subsection Battle of Salamis
- https://greekreporter.com/2021/03/03/how-ancient-greeks-harnessed-wind-power-to-win-the-battle-of-salamis/

Themistocles Source: Wikipedia

II. CLIMATE AND ITS INFLUENCE ON THE FALL OF THE ROMAN EMPIRE. *A different perspective*

- https://www.nbcnews.com/id/wbna41062539
- https://www.newscientist.com/article/dn19968-fall-of-roman-empire-linked-to-wild-shifts-in-climate/
- https://www.vox.com/the-big-idea/2017/10/30/16568716/six-ways-climate-change-disease-toppled-roman-empire *(N.B. With this reference you may want to start at the third paragraph which begins "By the time of the first Emperor Augustus" to avoid the self-congratulatory remarks about the U.S.A. made by the author)*

Roman Empire from greatest extent (117 AD) to end (460 AD). *Source: Wikipedia*

III. THE FIRST KAMIKAZE or *how weather defeated the Chinese invasion of Japan*

Portrait of Kublai Khan
Source: Wikipedia

- https://www.worldhistory.org/article/1415/the-mongol-invasions-of-japan-1274--1281-ce/ This account includes an excellent 9-minute video which summarises the whole situation very clearly. Of particular note are the comments at 4:05 minutes and 6:28 minutes which clearly state the role the weather played.
- https://en.wikipedia.org/wiki/Mongol_invasions_of_Japan gives a more generalised account

IV. CHARLES X11 INVADES RUSSIA 1709 *also known as The Great Northern War* (or possibly How to ruin your country without even trying very hard)

- https://dailyhistory.org/Why_did_Charles_XII_of_Sweden_fail_to_conquer_Russia_in_1708%3F (this includes an animated video on The Swedish Empire which, while interesting, only mentions Charles X11 in passing.) However the printed material gives a good summary of what happened.

Portrait of Charles 12
Source: Wikipedia

- https://www.thetimes.co.uk/article/weather-eye-the-savage-winter-that-ended-the-swedish-empire-r88v9nvn65j
- http://www.pierre-marteau.com/resources/charles-xii-sweden.html from paragraph 6 on
- https://medium.com/lessons-from-history/peter-the-great-of-russia-vs-the-swedish-empire-1a434230edf4 particularly the section "What was the Great Frost."

V. WASHINGTON LIVES TO FIGHT ANOTHER DAY or *How Fog helped Washington defeat the British (1766)*

George Washington
Source: Wikipedia

- https://1776history.com/2014/08/31/the-fog-that-saved-an-army/
- https://www.mountvernon.org/george-washington/the-revolutionary-war/ten-facts-about-the-revolutionary-war/ Section 3 in particular.
- https://www.historynet.com/escape-new-york.htm

VI. HAILSTORMS SPEED THE ONSET OF THE FRENCH REVOLUTION or *How drought in the 1790's caused food shortages which, added to other factors, caused revolution.*

"The Bread Famine and the Pawnbroker" , Brothers Lesueur Source: wikigallery

There is almost endless discussion on the French Revolution - most of which concentrates on the political reasons. The articles below do cover the general causes, but I have highlighted the sections which mention the weather.

- https://en.wikipedia.org/wiki/Causes_of_the_French_Revolution, particularly the section on Harvest Failures
- https://learnodo-newtonic.com/french-revolution-causes direct mention in points 6and 7of this entry
- https://www.historycrunch.com/causes-of-the-french-revolution.html#/ section on Weather conditions before 1789

VII. NAPOLEON'S INVASION OF RUSSIA 1812 or *Why winter fighting meant that* only 100,000 out of 600,000 men of the French *Grand Armée who entered Russia came out again*

Napoleon. Source: Wikipedia

Again there is so much material written on this subject that it would take many years to read it all. So, if you are interested in this topic, and want to know more details, the best plan of action is probably to look at some the websites I have given and then move onto sources that they quote.

- https://www.nationalgeographic.org/thisday/jun24/napoleon-invades-russia/#:~:text=Napoleon%20Invades%20Russia-,Jun%2024%2C%201812%20CE%3A%20Napoleon%20Invades%20Russia,Russia%20from%20present%2Dday%20Poland. A very concise summary
- https://en.wikipedia.org/wiki/French_invasion_of_Russia.
- https://www.newworldencyclopedia.org/entry/French_invasion_of_Russia
- https://www.warhistoryonline.com/napoleon/13-facts-napoleons-invasion-russia-cbc.html Another brief summary with contemporary illustrations
- http://www.climate4you.com/ClimateAndHistory%201800-1899.htm many issues covered with 4 specific sections on Napoleon in Russia and the weather

VIII. THE ERUPTION OF MOUNT TAMBORA IN INDONESIA o*ften called the year of no summer.*

Yet again a plethora of resources exist from which I have chosen what seem to be the most informative

- http://www.climate4you.com/ClimateAndHistory%201800-1899.htm This happens to be the same website as the previous one immediately under the discussion on Napoleon .It comes with an excellent graphic showing the effect on the temperature in England caused by the dust cloud from the eruption.
- https://en.wikipedia.org/wiki/1815_eruption_of_Mount_Tambora with a discussion on the disruption of global temperatures
- https://www.historytoday.com/archive/months-past/eruption-mount-tambora *includes a NASA photo of the volcano's massive caldera*
- https://en.wikipedia.org/wiki/Year_Without_a_Summer

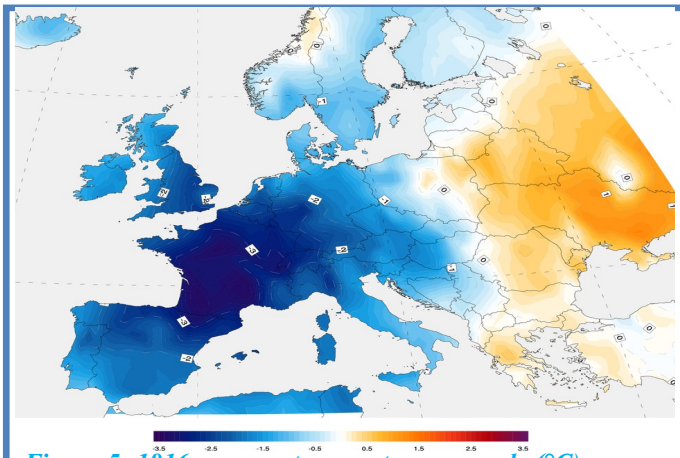


Figure 5: 1816 summer temperature anomaly (°C)

FOOTNOTE: For those with a particular interest in temperatures, in the first reference there are links to a chart that shows monthly noon temps. in Central England from 1659 to 1973. There is also the longest existing meteorological chart which gives air temps. in central England since 1659.

IX. HITLER'S INVASION OF RUSSIA 1941 or How winter assisted in the death of over 2,000,000 Germans.

Once more there is such a surfeit of resources including websites, books, documentaries and films on this topic that is almost overwhelming to consider them all. Again, one needs to select items of particular interest .

Source: Wikipedia

The winter weather of 1941-42 was more severe than usual - temperatures dropped at times to minus 40° (by chance where the Fahrenheit and Celsius scales coincide). This had a huge impact on many essentials for waging war such as supply lines, appropriate lubrication for all mechanical devices such as cars, trucks and tanks, appropriate warm clothing and footwear such as coats gloves, hats and snowshoes. Unsealed roads became mud. Horses were still being used for transport and often sank into the snow or froze to death. Blizzards limited the role of the Luftwaffe. While it was not just weather that defeated the Germans, it played a major part

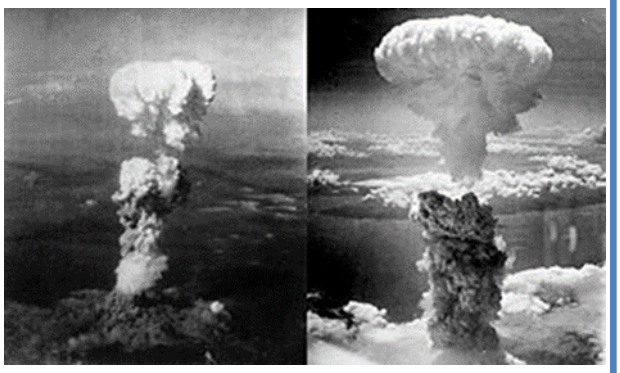
- https://dp.la/primary-source-sets/world-war-ii-s-eastern-front-operation-barbarossa/sources/1702 Of particular interest this pamphlet was written in 1952 by a committee **of** German generals and members of the German General Staff at the behest of EUCOM (the United States European Command). It discusses the effect of the weather on the German campaign and was originally classified as SECRET.
- https://histclo.com/essay/war/ww2/camp/eur/ger/bar/weath/bcw-wint.html a simple and accurate account with a good bibliography.
- https://www.tcc.fl.edu/media/divisions/library/citation-guide/turabianx2fchicago/Turabian-Sample-2012-Footnotes_ADA.pdf A very detailed 13 page essay (with corrections presumably from a teacher or lecturer) but easy to read and with an excellent analysis of how the German Meteorological service failed the Germans.
- https://www.history.com/topics/world-war-ii/operation-barbarossa The final section "*The Failure of Operation Barbarossa* "is a good summary of the campaign and once more, the sources used are given.
- https://worldwar2.org.uk/operation-barbarossa gives a precis of the whole campaign but the latter part of section 3 beginning "*Just as the Wehrmacht could see Moscow at the start of December, the weather began to deteriorate even more"* is the most relevant.

FOOTNOTE It has always seemed to this writer that Hitler hadn't read his history (or else had an over-inflated view of what he could achieve), Had he done so, he would have realised that the only successful invasion of Russia was that of the Mongols in the 1200's and, significantly, that they came from the east not the west

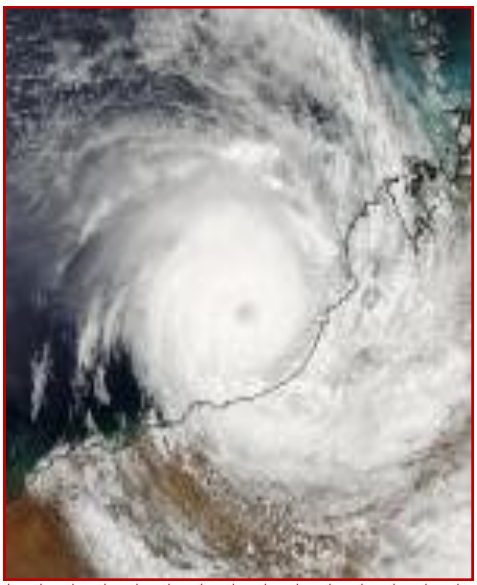
X. SUNSHINE OVER HIROSHIMA or *why Nagasaki was chosen for the site of the second atomic bomb*

Yet again a plethora of resources exist of which I have selected some which appear to be concise and accurate. As you will be aware, there is still endless debate on the morality of using the atomic bombs to end World War 2 in the Pacific. I have deliberately not got involved in this issue but tried to stay as factual as possible.

- https://en.wikipedia.org/wiki/Atomic_bombings_of_Hiroshima_and_Nagasaki gives a history of the development of the atomic bomb and in the section "Choice of Targets" explains why Hiroshima was chosen. Also, as mentioned in the website first mentioned in this article, the weather over the town was sunny and thus it was considered, weatherwise, a good day to do this
- https://www.ushistory.org/us/51g.asp An American perspective on why the bombs were dropped
- https://www.newyorker.com/tech/annals-of-technology/nagasaki-the-last-bomb Why Nagasaki had the second atomic bomb dropped on it - because of a handwritten addition to a list of targets
- https://www.atomicarchive.com/resources/documents/med/med_chp9.html Pages 8 to 10 of this article.



Mushroom Clouds: Hiroshima Nagasaki
Source: Wikipedia



☸ 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)*

Wreckage in the Rainforest: The Stinson Crash

by Bruce Davis

In the April edition of Monana I related the story of Australia's first major airline crash; the loss of the "Southern Cloud" in March 1931. My current topic is a very similar accident that occurred in February 1937, almost 6 years after the "Southern Cloud". Fortunately, this time there was a slightly better outcome.

Airlines of Australia Limited was established in October 1935 and commenced operations in January 1936. By 1937 it was operating a regular run between Brisbane, Lismore and Sydney using Stinson tri-motor monoplanes (See Figure 1). Stinsons were the last word in airline comfort and speed. A clean monoplane design with retractable undercarriage, trailing edge flaps, and variable pitch propellers produced a cruising speed of 170 mph and a cruising altitude of 8,000 feet. They were an instant success.

Figure 1 Stinson Trimotor Airliner
Source:Wikipedia

On Friday, 19 February 1937, Stinson VH-UHH was scheduled to depart Brisbane's Archerfield aerodrome at 1 pm for the regular afternoon service to Sydney via Lismore (see Figure 2). However, several factors contributed to a slight delay in departing.

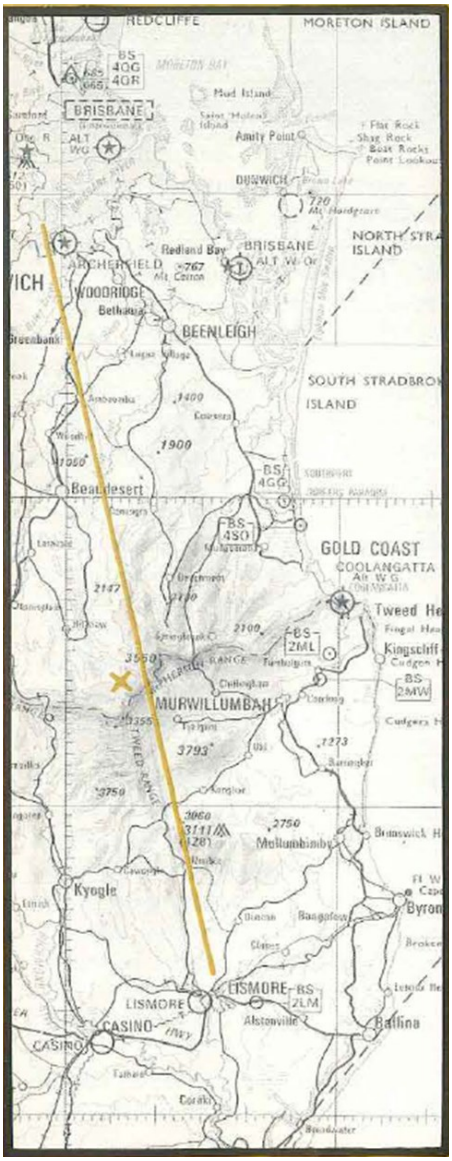


Figure 2: Planned Route of VH-UHH
Source: ATSB

The first was the weather. It was a moist, warm rather windy afternoon with the threat of rain from the grey overcast cloud at Archerfield. However, gale force winds resulting from a deep depression off the coast were producing heavy seas, cloudy conditions and widespread rain over much of the north coast of NSW. The effects tended to be localised to the coast with flying conditions improving rapidly inland. For the pilot-in-command of VH-UHH, Captain Rex Boyden, the weather gave no real cause for concern. He had flown VH-UHH to Brisbane from Sydney that morning via Grafton and knew quite well what could be expected on the coast, as well as the conditions inland.

Rather, Captain Boyden's main concern was with his scheduled landing at Lismore, where four passengers were booked to join the aircraft. Heavy rain at Lismore had affected the aerodrome surface, and the company's agent there had advised by telephone that the tops of the surrounding hills were in cloud. Altogether it was by no means certain that the scheduled landing at Lismore could be accomplished. However, there was a certain amount of pressure for pilots to collect passengers and deliver mail even if the weather looked problematic. Boyden would consider the risks along the route once underway and plan alternative paths if required.

Second, there was a booking problem with a passenger who had arrived on the company's Rockhampton flight that morning. The passenger was adamant that his return booking had been made in Sydney before he left for Queensland several days before. A telephone call to the company's Brisbane office failed to find any record of it.

Allowing for the four seats which had been allocated for the Lismore passengers, the aircraft was already fully booked. As the passenger was insistent, and the landing at Lismore seemed unlikely, he was permitted to board the aircraft.

Added to these issues, there was a further slight delay because of the last-minute arrival of a passenger who had arranged his own transport from Brisbane to Archerfield.

Eventually all was ready and the aeroplane took off into the fresh south-easterly breeze, setting course beneath the cloud base towards the distant MacPherson Ranges on the New South Wales border. On board were Captain Boyden, Co-pilot Beverly Shepherd and 5 passengers.

The Stinson was due at Lismore just before 2 pm, where the company's agent and the four passengers booked on the aircraft were waiting. VH-UHH carried no radio, and when nothing was heard of it over Lismore, it was not a cause of concern. It was just assumed that, because of the weather conditions, Captain Boyden had deliberately bypassed the town and continued directly to Sydney, perhaps flying further inland to avoid the high winds and low cloud on the coast. The fact that the captain had taken on the additional passenger at Archerfield also added weight to this view.

When the Stinson failed to arrive in Sydney as expected at about 5.30 pm, the first thought was that it had been forced to make an unscheduled landing at a landing ground with no telephone. But this initial optimism gradually faded with the passing of the hours. By 8.30 pm, with the aircraft now three hours overdue, the company's head office advised the Civil Aviation Branch (then part of the Commonwealth Department of Defence) and the company's Brisbane office of the situation. Arrangements made for aerial searches early the following morning from both Brisbane and Sydney.

At first light on Saturday, 20th February 1937, company aircraft took off from both Archerfield and Mascot to search the route. They were joined by Hawker Demons of the RAAF. At first the search operation was seriously hampered by the high winds and low cloud. As conditions gradually improved, a great variety of other civil aircraft of all types and sizes joined what was to become the greatest aerial search since the loss of the Southern Cloud. Indeed, it was one of the most intensive in Australia's aeronautical history.

From the overwhelming weight of witness evidence, it seemed highly unlikely that anything could have befallen the missing Stinson early in its flight from Brisbane. Many apparently reliable reports indicated that it had tracked via the coast from Brisbane and had been sighted in flight only about 40 kilometres north of Sydney. In retrospect it seems probable these were of the sister aircraft which flew the earlier service to Sydney that day. Hence the search was concentrated on the southern portion of the route. The areas north of Lismore were searched from the air at least once as the weather permitted but received scant attention by comparison.

As the days dragged on without finding a single clue about the fate of the missing aircraft it was finally concluded that the Stinson, somehow affected by the violent coastal weather, had crashed into the sea with the loss of all on board. An oil slick sighted offshore added to this point of view. Hence, the official search effort was reluctantly brought to a close after a week and the Air Accidents Investigation Committee made plans to commence an official enquiry. In banner headlines, a Sydney newspaper asked, ‘Is it another Southern Cloud?'

But one man thought differently. This was Bernard O' Reilly who ran a guest house at Green Mountains, part of the MacPherson Ranges in the Gold coast hinterland. Friends and neighbouring families living on the northern side of the MacPherson Ranges assured him they had seen the Stinson tracking towards the ranges in the direction of Lismore.

The weather on the mountains that day, particularly the force of the wind, had been the worst for many years. When the newspapers finally reached him several days later he read that intending passengers had waited in vain at Lismore for the Stinson to arrive. So on a survey map of the local area he drew a line to Lismore from the last sightings of the Stinson by his friends and neighbours. This line crossed four high ridges, spurs jutting out in a westerly direction from the main range along the NSW-Queensland border. He concluded there could be only one answer - the aeroplane was lying somewhere in the rainforest of the MacPherson Ranges.

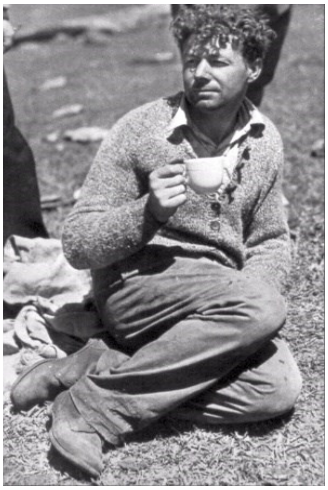


Figure 3. Bernard O'reilly
Source: Wikipedia

So, on February 28, 1937, Bernard O' Reilly put on his boots to go in search of the wreck.

The story of how he single-handedly found the wreck amid the almost impenetrable rainforest, and then led a rescue party to the accident site to save the lives of the two survivors, has passed into Australian history. A moving and authentic first-hand account is found in his own book “Green Mountains”, published in 1940. This is also available at: http://www.chapelhill.homeip.net/FamilyHistory/Other/QueenslandHistory/THESTORYOFTHESTINSONWRECK.htm

At 8 am on 1st March, a break in the clouds enabled him to view a light brown treetop, highly unusual in summer. He quickly surmised that the most likely cause was fire and the most likely cause of this fire in the wet conditions was burning aviation fuel. Eight hours later he reached the wreckage.

Figure 4: Stinson wreckage
Source: LotsafreshAir

About five hours after this first view Bernard heard a human voice calling out then another. His first thought was that other searchers were in the area. Three hours later Bernard believed he was close to the dead tree he had seen so he called out “Coo-ee”. This was answered. Guided by the calls Bernard reached the wreckage and found 2 survivors: one with a gangrenous, maggot infected broken leg (the maggots probably stopped the gangrene from spreading further) and the other in poor condition but otherwise still alive.

Bernard then set off to get more help. On his way he came across the body of a third survivor of the crash who had died after falling down a cliff while attempting to walk out of the ranges seeking help for the two other survivors.

On his way to get help Bernard came across other local residents who assisted him to reach a nearby farm with a telephone. Within 20 minutes of the call the rescue was organised. Bernard set out about 2am to take the doctor and a small group with medical supplies and food to the crash site. They reached the injured men about 10am. A second group worked feverishly to cut a track up a sloping ridge and along the top of Lamington Plateau. This allowed the survivors to be carried out to the waiting ambulances and media at what is now called Stinson Park on Christmas Creek. On Tuesday 2nd March at 4.15pm, the exhausted party reached the foot of the mountain and the last of the treacherous terrain. The 2 survivors were rushed to hospital. The rescue had succeeded.

The evidence of the two survivors, meteorological reports and records, and the accounts of eyewitnesses enabled the apparent cause of the accident to be deduced. It appears that Captain Boyden decided to fly via Lismore which would avoid the heavy rain battering the coast. However, this took the aircraft across the rugged and steep-sided MacPherson Ranges which rise in places to almost 4000 feet. A witness described seeing the Stinson flying in and out of the lowest cloud but still above the ridge tops.

However, further to the south the cloud base descended and the strong south-easterly winds striking the southern face of the McPherson Range plateau caused extreme turbulence to a considerable height. Such conditions were quite rare and probably not expected by the pilots. People living in the area described it as the wildest weather they had experienced for years. The pilot of the Stinson which flew the Sydney-Brisbane service on the afternoon of the accident reported exceptionally strong tail-winds from a point just south of the MacPherson Ranges.

The ridge on which the aircraft crashed is the southernmost spur on the aircraft's track jutting out westwards from the main MacPherson Range. While the more northerly mountain spurs further back along the aircraft's track would have been sheltered from the wind to some degree, this main range (a veritable mountain wall more than 3000 feet high rising almost vertically from the coastal plain) was exposed to the full force of the 60 knot gale. This would have produced extremely powerful downdraughts on the lee side of the range and its immediately adjacent spurs.

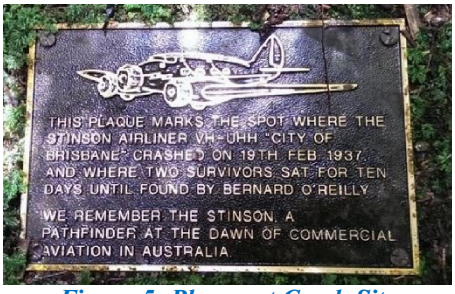


Figure 5: Plaque at Crash Site Source: Wikiloc

Where the Stinson crashed the downdraughts would have been at their most violent. At this point the aircraft would have to squeeze through a small clearance to maintain visual contact. However, flying directly into the extremely severe but invisible down-rush of air and, too late to turn back, the Stinson would have been carried below the summit and plunged into the treetops. Though prepared for some turbulence and strong headwinds over the mountain, it seems that the captain had no idea of the true strength of the downdraughts which would have existed in the lee of the ranges that day.

Three passengers, all sitting on the left side of the aircraft, were able to evacuate. By the time they had made their escape, the cabin was a mass of flames and there was no hope of rescuing the other occupants, even if any had survived.


Figure 6: Memorial at crash site Source: Wikiloc

A point emphasised during the subsequent enquiry into the loss of VH-UHH, was that if radio had been carried and regular position reports made, the area in which the aircraft disappeared would have been known and the survivors may have been located much more quickly. It was a surprise to many that although more than six years had passed since the loss of the “Southern Cloud”, radio communication was still not required on such aircraft operations. Only a fortnight later, the Minister responsible for Civil Aviation announced that equipment had been ordered for the construction of two-way aeronautical radio stations at Brisbane, Sydney, Canberra, Melbourne, Adelaide, Launceston and Hobart. Plus, the Civil Aviation Branch was to re-examine the Regulations with a view to enforcing the carriage of radio communication equipment in all airline aircraft in the future.

The accident to VH-UHH also forcefully demonstrated the need for use of radio navigation aids on Australian air routes. Even before the accident, the Lorenz radio navigation system was being studied by the Department of Defence and an experimental installation had been undergoing tests in Melbourne. Now it was announced that as these tests had proved satisfactory the Minister 'expected it would be decided to install the system at Brisbane, Sydney and Melbourne,' 'within the next three months'. Unfortunately, these systems were still not operational two years later when Australian National Airways' DC-2 Kyeema flew into the top of Mt. Dandenong, Victoria, while attempting to let down through cloud into Essendon.

What of Bernard O'Reilly? He only returned to the crash site once, when he took members of the crash victim's families there. However, his fame spread. In addition to his own book "Green Mountains", his amazing story became well known to guests staying at O'Reilly's Guest House. In 1987, a TV film called "The Riddle of the Stinson" was made. It starred a young Jack Thompson as Bernard O'Reilly, the laconic bush hero involved.

Figure 7:Bronze statue at O'Reilly's Rain-forest Retreat depicting the rescue Source:

The area is now part of the Lamington National Park with O'Reilly's Guest House now a Rainforest Retreat located in the Park. Walking tracks now follow Bernard's footsteps and a bush campsite is located near the crash site.
O'Reilly's Bush Retreat also organises guided walks to and from the site. If anyone is keen and fit enough to undertake these walks then they can see for themselves the site of the crash, understand the difficulties involved in the rescue and appreciate the achievements of Bernard O'Reilly.

IMPORTANT AMETA ISSUES

- ***The upcoming meeting (August 24th) is the AGM and a new committee is required (see From the President's Pen on page 1). If you or anyone you know is interested in joining the committee please arrange for completion of the form at the end of this magazine and bring it to the meeting or forward it to president@ameta.org.au.***
- ***Subscriptions ($20 per annum) for the 2021-2022 year are now due.***

Future Monana Publication

Currently 5 copies of Monana are published per annum whereas the constitution only requires one. In the past the magazine has not only provided information to members but also provided advice of upcoming meetings. With the increasing use of electronic communications such as email this advice function has largely been superseded. Also, much of the information (such as climate summaries) previously only available via Monana is now readily available through the BOM website. Other information is now also becoming available on the AMETA website. As a result of these factors, plus other pressures, it is now proposed (and agreed in principle by the committee) to reduce the number of publications per year, starting in 2022. At present it is intended to provide editions as and when requirement/availability exists, with a minimum of one per year. As per the constitution the content will include 'information such as a summary of presentations, discussions, together with other interesting aspects of the organisation's activities."

As this proposal is a significant change your feedback would be appreciated. Feedback can be emailed to monana@ameta.org.au

Adelaide (West Terrace / Ngayirdapira), South Australia
June 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	Tu	11.8	21.2	0			NNE	24	00:54	14.8	37		ENE	11	1017.4	20.6	34		NNE	7	1014.2
2	We	13.2	21.9	0.6			NW	26	14:01	15.7	61		NE	7	1013.4	19.8	51		NNW	11	1011.2
3	Th	7.8	17.7	0			WSW	28	20:25	11.9	84		NE	7	1018.0	16.0	77		WSW	13	1017.4
4	Fr	11.9	17.1	1.2			W	33	04:12	13.8	78		S	9	1022.4	16.0	49		WSW	15	1021.7
5	Sa	7.9	16.8	0.2			NNW	30	13:08	10.7	70		NNE	9	1024.1	16.3	70		NW	19	1021.4
6	Su	10.6	19.8	0			NNW	33	13:41	14.0	80		N	11	1023.7	19.4	52		NW	19	1020.4
7	Mo	12.7	20.7	0			NNW	69	12:54	14.2	66		N	19	1013.2	20.0	39		NNW	22	1005.1
8	Tu	6.6	12.6	13.0			WSW	46	02:22	7.8	88		ESE	15	1007.9	9.2	75		S	9	1010.8
9	We	4.9	14.3	5.2			SSW	43	12:25	10.5	74		S	11	1022.7	13.3	55		SSW	19	1021.4
10	Th	8.7	14.4	0			SSW	35	13:35	12.7	61		S	13	1019.7	13.9	74		S	13	1016.2
11	Fr	11.9	16.6	0			SW	20	12:07	13.6	84		SW	6	1018.2	15.2	77		SW	9	1015.7
12	Sa	12.1	15.0	0			N	17	12:23	13.0	85		NE	9	1018.2	14.8	60		N	7	1016.4
13	Su	8.9	18.7	0			N	20	11:06	12.3	72		NE	7	1016.6	17.7	45		NNE	7	1013.5
14	Mo	12.3	20.5	0			N	33	12:44	14.9	62		E	2	1012.3	18.8	41		NE	17	1009.6
15	Tu	13.6	18.8	0			NW	33	19:26	14.7	59		NNE	11	1010.2	16.4	70		NNW	11	1006.7
16	We	9.3	14.3	13.6			NNW	33	11:52	9.8	81		N	13	1008.8	13.2	70		NNW	20	1008.8
17	Th	9.7	16.3	0			ESE	28	19:59	14.1	88		W	7	1013.8	11.0	90		WSW	9	1012.7
18	Fr	9.2	15.8	46.0			SW	46	13:55	10.5	98			Calm	1019.9	15.5	68		SSW	19	1021.3
19	Sa	6.8	15.1	0			SW	20	11:28	11.3	89			Calm	1028.2	13.8	88		SSW	7	1026.3
20	Su	7.4	15.8	0.8			WSW	15	16:03	10.1	96		NNE	2	1027.4	14.5	52		SSW	7	1024.2
21	Mo	6.7	16.3	0.2			NE	28	22:02	10.7	68		NE	9	1025.4	16.0	49		NNE	13	1021.6
22	Tu	10.7	16.4	0			NNE	41	10:04	15.1	48		NNE	19	1020.8	15.8	53		NNE	17	1016.9
23	We	11.8	14.8	2.2			NNW	41	16:05	12.0	84		N	13	1012.6	14.2	62		NNW	19	1008.5
24	Th	9.7	15.6	5.0			WNW	52	10:59	12.8	84		NW	24	1003.5	14.9	72		WSW	20	1006.3
25	Fr	10.5	14.1	2.0			W	39	14:02	12.0	84		W	13	1015.5	11.1	86		NW	19	1016.0
26	Sa	9.1	13.5	4.0			NW	31	14:36	11.3	72		WSW	15	1024.8	11.9	84		WNW	15	1024.9
27	Su	11.0	15.5	7.6			NNW	20	11:03	11.3	99		N	11	1028.7	14.9	88		NW	9	1027.8
28	Mo	7.5	17.3	4.8			N	26	11:29	13.1	83		NNE	7	1029.7	16.6	61		NW	9	1026.1
29	Tu	8.4	16.7	0			NNE	28	10:02	11.9	68		NE	13	1027.5	16.5	48		NNE	13	1023.2
30	We	7.3	17.6	0			NNW	33	13:26	13.1	48		NNE	9	1022.0	17.1	45		NW	17	1019.3
Statistics for June 2021																					
Mean		9.7	16.7							12.5	75			10	1018.9	15.5	62			13	1016.9
Lowest		4.9	12.6							7.8	37			Calm	1003.5	9.2	34		#	7	1005.1
Highest		13.6	21.9	46.0			NNW	69		15.7	99		NW	24	1029.7	20.6	90		NNW	22	1027.8
Total				106.4																	

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 June 2021: wetter than average

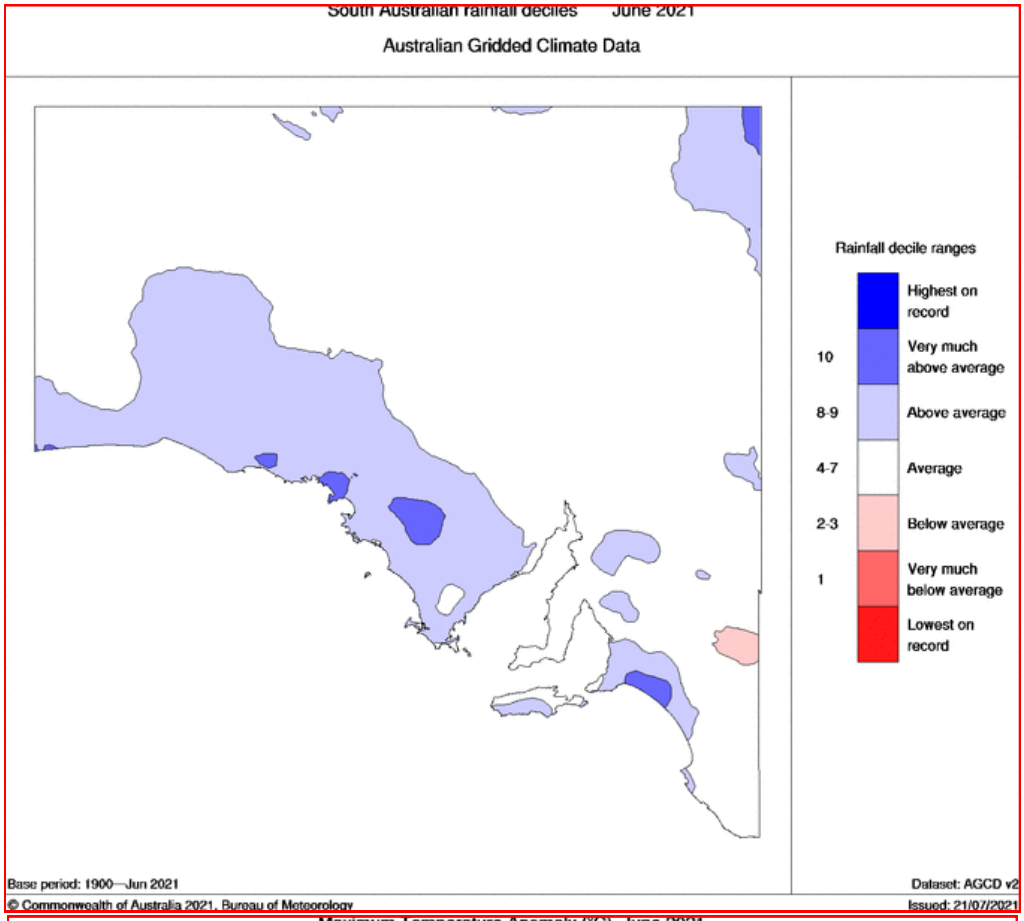
Rainfall was above to very much above average for June at most sites across Adelaide and the Hills. Averaged across Greater Adelaide as a whole, it was the wettest June since 2012. Mean daytime and nighttime temperatures were above average throughout Greater Adelaide, despite a few cold days around the 8th and again later in the month.

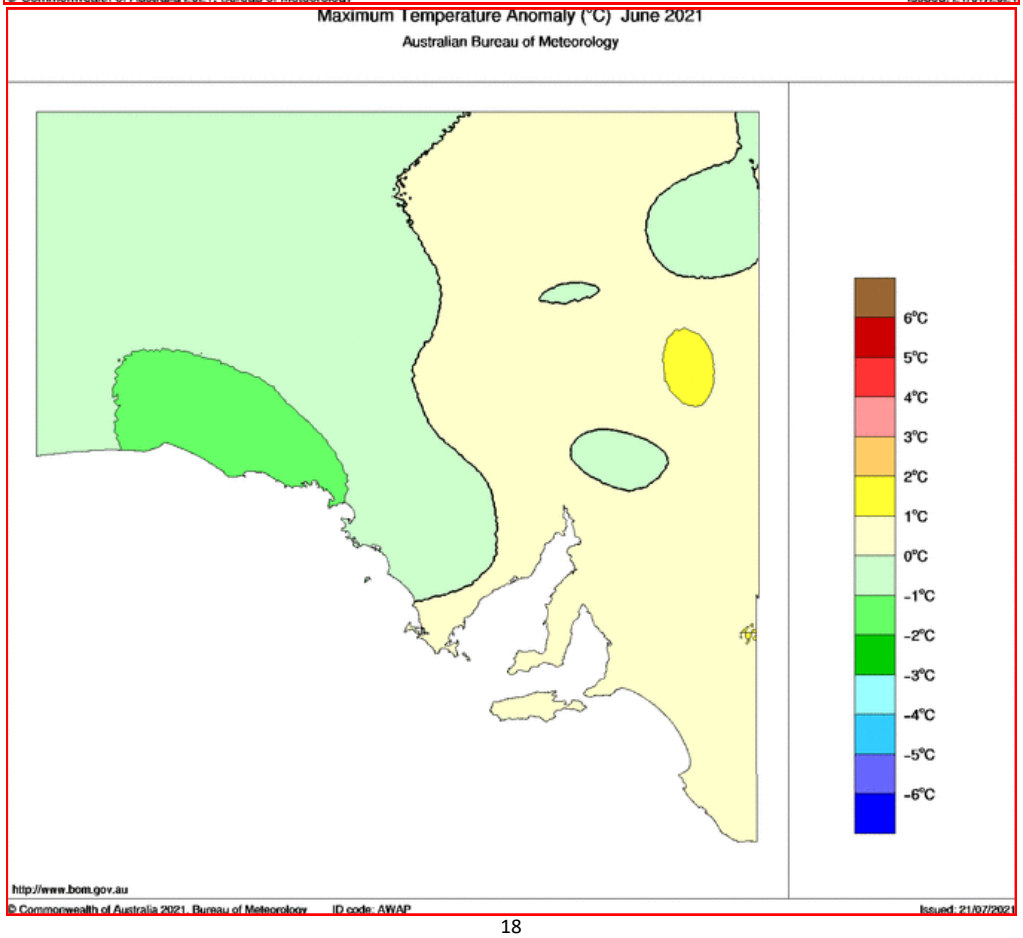
For more information plus a summary of June's statistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202106.adelaide.shtml

South Australia in June 2021: wettest since 2016

Rainfall was above average for most of the southern Agricultural districts, but closer to average in the Lower South East. For South Australia as a whole, it was the wettest June since 2016. Daytime temperatures were generally close to average or warmer than average in the state's east, but were cooler than average in the west, particularly in the West Coast district Night-time temperatures were above to very much above average in central and eastern Agricultural districts but were cooler than average in state's north-west.

For more information plus a summary of June's statistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202106.summary.shtml





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		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	10.4	15.5	0			WNW	26	15:26	11.0	73		NNE	11	1021.9	14.9	64		WNW	15	1018.9
2	Fr	8.3	12.8	7.0			WSW	46	20:32	8.4	81		SW	15	1015.3	12.0	55		WSW	19	1016.0
3	Sa	7.0	13.3	6.4			SW	35	09:45	10.9	69		WSW	15	1020.8	12.1	75		WSW	17	1019.5
4	Su	7.5	14.2	1.4			SW	28	12:59	10.0	86		NNE	6	1023.7	13.7	64		WSW	15	1023.4
5	Mo	5.8	13.8	0.6			NE	17	09:06	9.3	84		NE	9	1025.7	13.3	57		N	7	1022.6
6	Tu	8.2	15.8	0			N	28	12:06	9.7	73		NE	11	1022.5	15.1	51		N	11	1020.1
7	We	8.9	16.5	0			N	33	12:55	10.5	60		NE	11	1022.9	15.7	44		NNW	15	1019.6
8	Th	10.0	16.2	0			NNE	28	11:12	11.9	52		NE	13	1017.9	15.3	45		NNE	11	1014.5
9	Fr	6.4	14.3	0			WNW	22	15:02	9.8	66		NE	9	1016.8	13.2	82		WNW	11	1017.0
10	Sa	5.4	17.1	0.8			NE	30	23:27	7.6	99		NNW	7	1024.6	15.9	69		W	7	1022.0
11	Su	7.4	16.3	0			NE	35	10:49	14.0	49		NNE	13	1020.4	15.8	45		NNE	17	1015.9
12	Mo	8.9	15.2	0			W	30	14:32	11.6	86		N	9	1016.7	15.0	78		WNW	15	1015.2
13	Tu	10.2	17.4	0.4			NNW	46	20:06	11.3	76		NNE	15	1013.9	16.0	51		N	19	1008.2
14	We	10.4	18.3	10.2			NNW	50	11:24	12.5	91		N	13	1002.8	17.9	66		NW	20	999.9
15	Th	10.6	18.0	0.2			NW	69	15:33	11.5	91		N	11	1001.0	16.6	56		NNW	22	995.1
16	Fr	9.3	15.1	8.2			WNW	74	15:23	10.7	93		NW	22	995.6	13.3	78		WNW	24	996.0
17	Sa	6.9	14.1	14.2			WSW	65	02:09	11.7	65		WSW	20	1007.8	13.4	67		SW	22	1011.8
18	Su	7.1	13.8	1.4			SW	19	00:31	10.0	92		NNE	4	1019.7	12.2	72		WNW	11	1018.4
19	Mo	7.5	15.0	0			NW	33	13:13	8.5	90		N	11	1018.9	14.6	67		NW	20	1015.1
20	Tu	8.5	13.7	7.4			WSW	50	06:21	11.2	89		SW	17	1014.9	12.6	46		SSW	28	1019.8
21	We	4.2	12.8	1.0			NE	24	22:08	7.7	76		NE	13	1025.9	11.4	66		NNW	13	1021.3
22	Th	6.1	9.1							6.9	80		NE	17	1008.5	8.8	74		NNE	17	1001.5
23	Fr	6.0	14.6							8.9	93		N	6	1006.5	13.5	75		W	9	1004.7
24	Sa	8.6	12.8	10.8			WSW	72	20:16	8.6	88		WSW	13	1002.6	10.4	71		W	19	1001.2
25	Su	7.0	14.2	12.4			NW	46	12:28	11.4	81		NW	13	1012.2	14.0	81		NW	24	1012.0
26	Mo	8.8	16.9	4.2			NW	39	13:05	10.9	79		NNW	17	1015.2	16.4	56		NW	19	1012.5
27	Tu	10.7	19.2	0			N	56	11:50	14.8	45		NNE	24	1004.5	18.0	37		NNW	26	998.3
28	We	11.7	15.3	2.8			WNW	76	09:51	13.0	79		NNW	20	1004.5	14.4	54		W	26	1007.8
29	Th	6.8	16.1	3.0			N	35	11:55	9.8	76		NNE	11	1016.6	15.6	45		NNW	20	1013.0
30	Fr	9.7	19.8	0			N	43	00:58	14.9	50		NNE	13	1007.0	18.9	49		N	17	1003.3
31	Sa	12.3	14.9	0			W	30	14:10	14.2	69		NE	11	1004.7	11.5	96		SW	13	1005.2
Statistics for July 2021																					
Mean		8.3	15.2							10.7	76			12	1013.9	14.2	62			17	1011.9
Lowest		4.2	9.1							6.9	45		NNE	4	995.6	8.8	37		#	7	995.1
Highest		12.3	19.8	14.2			WNW	76		14.9	99		NNE	24	1025.9	18.9	96		SSW	28	1023.4
Total				92.4																	

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 July 2021: wet, with close to average temperatures

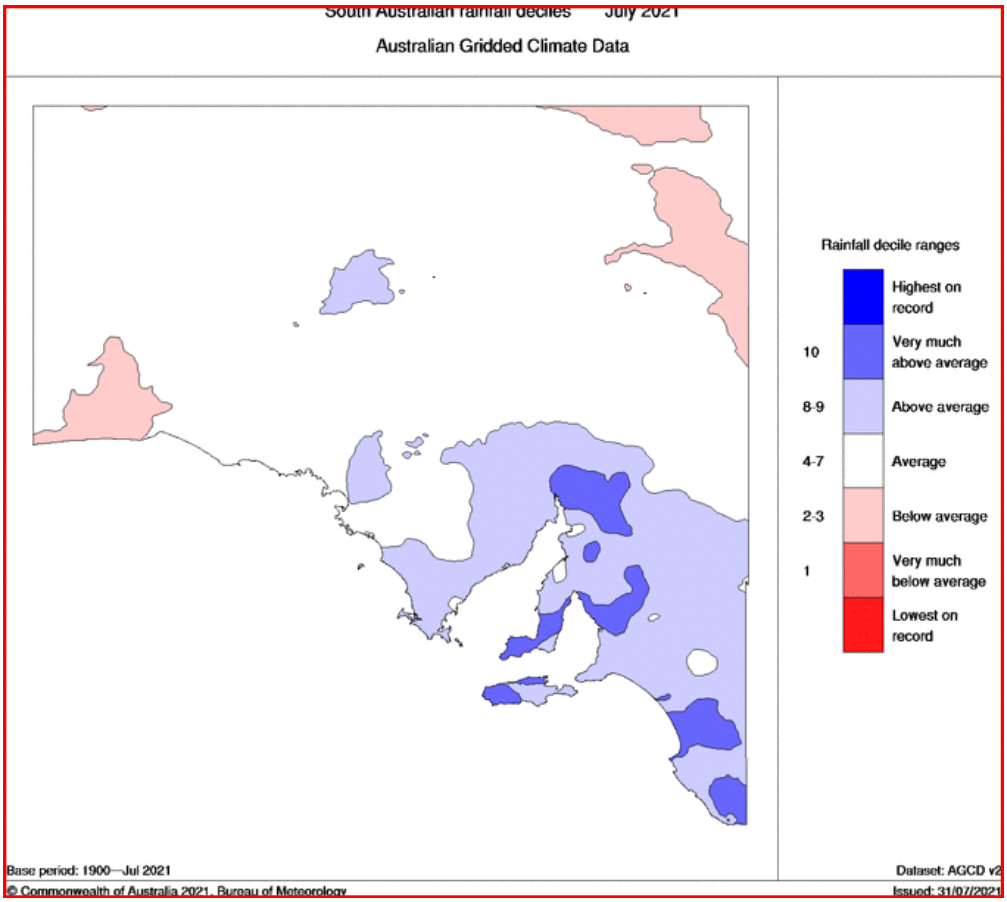
Rainfall in July was above to very much above average at most sites across Adelaide and the Hills, and for Greater Adelaide as a whole, it was the wettest July since 2016. Mean daytime and night-time temperatures for July were within 1 °C of average at most sites across Adelaide and the Hills, despite a very cold day on the 22nd.

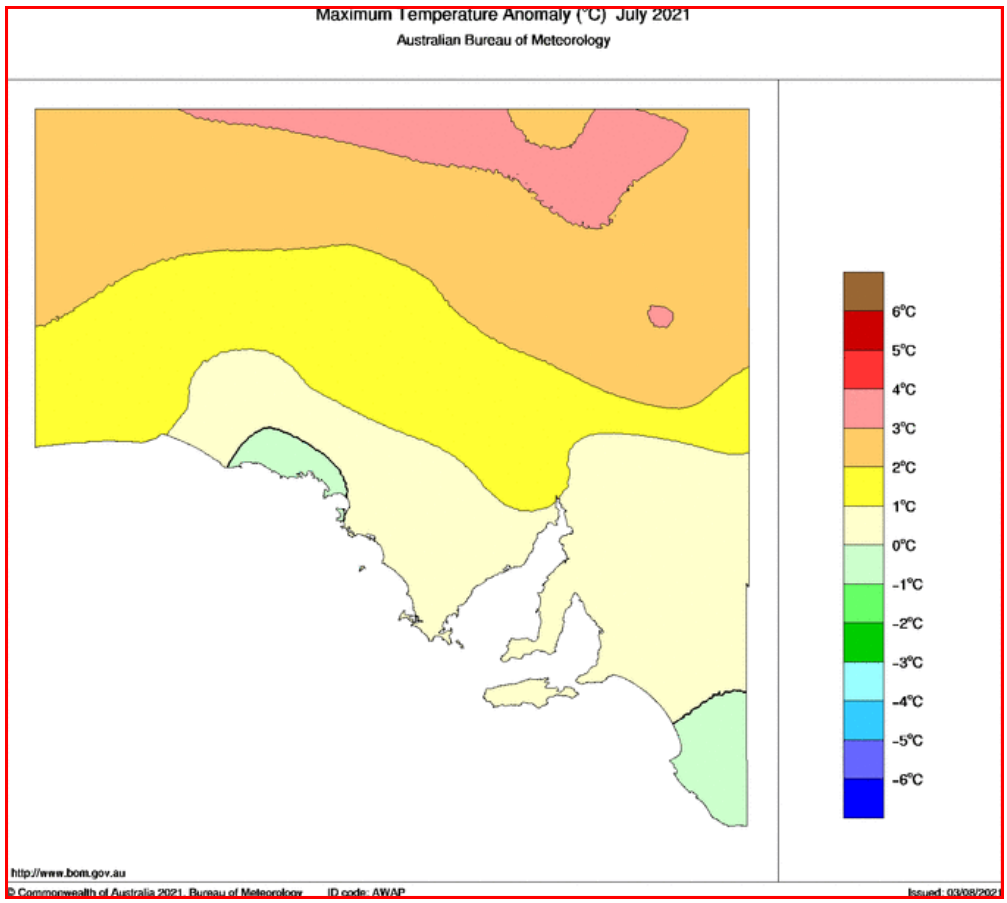
For more information plus a summary of July's statistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202107.adelaide.shtml

South Australia in July 2021: warm in the north, wet in the south

Rainfall in July was above to very much above average in the state's central and eastern agricultural districts, but below average in parts of the north. For South Australia as a whole, it was the wettest July since 2016. Daytime temperatures were very much above average throughout the state's north, but closer to average in the south. Night-time temperatures were very much above average in the western half of the state, but close to average in the east. The mean temperature for South Australia as a whole was the second-highest in July on record and highest since 1975.

For more information plus a summary of July's statistics please see:
http://www.bom.gov.au/climate/current/month/sa/archive/202107.summary.shtml





NEXT MEETING (AGM)

7.00 PM TUESDAY 24 August 2021

(Please note the change of date & 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-and-climate-forecasting-whats-changing-tickets-166234334369?aff

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.

Please also note wearing a mask at the meeting is a requirement. Masks will be available for a fee.

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 a 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.

For further information about AMETA & meeting details please contact:

Secretary	secretary@ameta.org.au

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

AGM Elections 2021

Committee Nomination Form

POSITION_____

NOMINEE_____

Signature of Nominee_____**Date**

Nominated by_____ **Date**

Seconded_____**Date**