

## 1. What is the Bureau's role in managing temperature data?

The Bureau manages and maintains the equipment that collects the data that makes up Australia's temperature record. The Bureau also has highly qualified staff with the scientific expertise to collect, curate and analyse the data.

## 2. What is ACORN-SAT?

The temperature data that comprise Australia's long-term climate record are known as ACORN-SAT (Australian Climate Observations Reference Network – Surface Air Temperature).

## 3. What is homogenisation?

Homogenisation refers to the method of adjusting temperature records to remove artificial biases, such as the impact of a weather station moving from one location to another.

## 4. Why do weather stations move location, and how does the Bureau maintain the integrity of the data?

Weather stations move for a variety of reasons. For example, an observing site at an airport may be required to move to accommodate new buildings or other infrastructure. The Bureau employs standard statistical methods to account for the impact of site moves on the temperature record.

## 5. How are the temperature data adjusted?

Statistical tests and documentary records are used to identify and correct for artificial biases in the temperature record.

## 6. Does the Bureau provide raw temperature data?

Yes—the Bureau provides the public with raw, unadjusted temperature data for each station or site in the national climate database, as well as adjusted temperature data for 112 locations across Australia.

Links to observational data are available on the Bureau's website by clicking on the map at

[www.bom.gov.au/climate/data/](http://www.bom.gov.au/climate/data/)

## 7. Where can I find information on individual stations, for example Rutherglen?

All Bureau observations sites, including ACORN-SAT sites, publish data directly to our website.

## 8. What are 'digitised' data?

Digitised data are observations that have been transcribed from their original paper records to an electronic database.

## 9. Why does the ACORN-SAT dataset start in 1910, and not earlier?

Climate observations prior to 1910 were limited across the Australian continent, being concentrated mostly around settlements and in eastern Australia. Many observations from the pre-federation period were taken with non-standard instrumental configurations, and the accompanying documentation is patchy. This makes it very difficult to reconstruct early national data that is consistent with the modern record.

## 10. How do temperatures in the pre-federation period compare to the present?

Southeast Australian observations extending back to 1860 indicate that pre-federation temperatures were very similar to temperatures observed during the period 1910–1950. Temperatures in recent decades are on average warmer than last century.

## 11. Why do global datasets include Australian data prior to 1910, when such data are not included in ACORN-SAT?

Pre-1910 records are not included in ACORN-SAT because they are insufficient in their continental coverage. Specific international global data analyses use some early temperature data from Australia to construct monthly and annual-mean hemispheric and global temperature averages. This differs from ACORN-SAT, which constructs a continent-wide daily temperature record for Australia. Pre-1910 estimates of Australian annual-mean temperature from just a few sites are very uncertain.

**12. Are trends in Australian annual-mean temperature affected by changes to the observing network over time?**

No—the Bureau’s method for analysing Australian temperature records accounts for changes in the observing network over time.

**13. What are the differences between adjusted and unadjusted trends?**

Adjustments ensure that trends in the climate record can be accurately attributed to changes in temperature—and not due to changes in the site or the equipment used to take the measurements. The current trend in Australia’s temperatures is evident in both adjusted and unadjusted temperature data, and is similar to the global warming trends published by many other agencies.

**14. How does the urban heat island effect impact the climate data?**

The urban heat island effect can increase surface-air temperature at urban locations. While studies have found the effect has minimal impact on global long-term temperature trends, urban sites are not included in the Bureau’s assessments of temperature trends across Australia.

**15. How do the trends in ACORN-SAT compare to other datasets?**

The trends in the Bureau’s temperature data are in close agreement with trends derived independently by other agencies. Warming in Australian surface temperature closely matches warming seen in the oceans surrounding Australia and in the Pacific Islands.

**16. How do the adjustments in the ACORN-SAT dataset affect the representation of extreme temperatures?**

Temperature data adjustments make almost no difference to the characterisation of extreme temperatures or the change in extreme temperatures over the past 100 years.

**17. When was Australia’s warmest year on record?**

Australia’s warmest year on record was 2013 according to multiple datasets, regardless of whether they were adjusted or not.

**18. Why do some days in the ACORN-SAT dataset have maximum temperatures that are cooler than minimum temperatures?**

This is an artefact of the adjustment process at some locations. The maximum and minimum temperatures are analysed independently, so on a very small number of days where there is little difference between the overnight minimum temperature and the daytime maximum temperature, the small adjustments can mean the minimum temperature is slightly higher than the maximum after analysis. It has no impact on trends derived from the dataset.

**19. How is data from ACORN-SAT used in climate models?**

Climate models typically do not use any observational climate data such as surface temperature observations. Hence, datasets like ACORN-SAT are not used to produce projections of possible future climates, such as those reported by the International Panel for Climate Change (IPCC).

**20. Why are there differences between satellite data and observations using surface thermometers?**

The satellite data and surface thermometers do not measure the same thing. Satellites measure the average temperature between the surface and three to ten kilometres above the surface. Ground-based thermometers measure the surface-air temperature, typically taken 1.5 m above the ground.

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