

10.7 A CENTENNIAL-SCALE CLIMATE-CHANGE ANOMALY OVER A SMALL REGION

Harvey Stern*
Victorian Regional Office, Bureau of Meteorology, Australia

1. INTRODUCTION

In 1937, an extensive study was carried out by the then (Australian) Commonwealth Meteorologist (W. S. Watt) into the climate of the small south-east Australian State of Victoria (Watt, 1937).

That study presented the climate means for rainfall, pressure, temperature and humidity at four of the State's major cities and 33 of its country centres for the period of record ending 1935.

Regarding this record as a "base", the present paper explores changes in mean annual temperature recorded in Victoria subsequent to 1935.

2. ANALYSIS OF DATA

2.1 Analysis of data from Watt's climate stations

Analysis of data from Watt's set of climate stations reveals that a small fall in mean annual temperature of 0.07°C has occurred since 1935.

This is made up of a fall of 0.03°C in the mean annual minimum temperature and a fall of 0.12°C in the mean annual maximum temperature.

2.2 Expanding the data base

Expanding the data base to include all Victorian stations with record lengths of at least ten years since, and prior to, 1935, provides data from 68 locations.

The earlier conclusion is both confirmed and strengthened with an average fall in mean annual temperature of 0.07°C also being found.

This is made up of a fall of 0.02°C in the mean annual minimum temperature and a fall of 0.12°C in the mean annual maximum temperature.

2.3 An exception to the overall picture

There is one notable exception from the overall picture. That exception is the city of Melbourne, Victoria's State Capital.

The data specifically for Melbourne, a highly urbanised city of over three million people, does not reflect the changes in mean temperature depicted in the full data-base.

On the contrary, a small rise in mean annual temperature of 0.53°C has occurred since 1935. This is made up of a rise of 0.77°C in the mean annual minimum temperature and a rise of 0.29°C in the mean annual maximum temperature.

3. DISCUSSION OF RESULTS

3.1 For Victoria as a whole

The average fall in mean annual temperature over the 68 Victorian locations is small and is not statistically significant (at the 5% level).

However, the finding is in contrast to the findings of similar works carried out for other regions of the globe, including other parts of Australia, and there appears to be no readily apparent explanation as to why the results for Victoria should be different from elsewhere.

Nevertheless, the finding provides observational support to the findings of climate modellers that one would anticipate global climate change to exhibit considerable spatial and temporal variability.

3.2 For Melbourne, specifically

For Melbourne, by contrast, the rise in mean annual minimum temperature is statistically significant. This result is readily explained in terms of the "urban heat island effect".

4. SUMMARY

Analysis of long-term temperature data reveals a small, albeit not statistically significant, fall in the average temperature across the small south-east Australian State of Victoria.

This provides observational support to the findings of climate modellers that one would anticipate global climate change to exhibit considerable spatial and temporal variability.

Acknowledgement. The author takes great pleasure in thanking Mark Williams, of the Victorian Regional Office, for his suggestions regarding this paper.

5. REFERENCE

Watt, W. S. 1937: Results of rainfall observations made in Victoria (supplementary volume). *Bureau of Meteorology, Australia*, 253 pp.

*Corresponding author address: Harvey Stern, Victorian Regional Office, Bureau of Meteorology, Box 1636M, Melbourne, 3001, Australia; e-mail: H.Stern@bom.gov.au