

# Urbanisation and maximum temperature

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The Australian Data Archive for Meteorology (ADAM) is used to compare trends in maximum temperature (MAXTEMP) at Sydney and Melbourne with those at other (less urbanised) Australian localities.

By this means, the relative extent to which MAXTEMP increases in those cities can be attributed to urbanisation, the enhanced greenhouse effect, and other causes, is quantified.

The influence of cities on overnight temperatures is well documented. However, their influence on daytime temperatures is less well documented.

Sydney and Melbourne MAXTEMP data are compared with other ADAM data sets and are found to be increasing at a faster rate than elsewhere.

For both localities, annual MAXTEMP data are statistically modelled over various control periods using MAXTEMP data at surrounding non-urban stations as input.

Thereby, sequences of non-urbanised MAXTEMP can be constructed for the hypothetical circumstance of the cities not being built.

Synoptic stratification of daily data shows that a recent "jump" in the Melbourne series is due to buildings constructed immediately to the south of the site.

In contrast to the current study, Torok's (1996) PhD work identified, and adjusted for, "... jumps in the time series due to non-climatic changes... (and this consequently removed) ...urbanisation signals from the time series".

Torok's adjustments have been applied to the derivation of the Bureau of Meteorology's high quality data sets (HQDS).

The current study's approach (using ADAM data sets) has been to identify, and preserve, the urbanisation signals in the time series.

As would be expected, MAXTEMP rising trends in the Melbourne and Sydney HQDS (with the urbanisation signals removed) are found to be slower than those in the corresponding ADAM data sets (without the urbanisation signal removed).

### References:

Bureau of Meteorology, Australia, 13 October 2010, Media Release, "Hot cities": [http://www.bom.gov.au/announcements/media\\_releases/ho/20101013.shtml](http://www.bom.gov.au/announcements/media_releases/ho/20101013.shtml)

Stern H, Campbell B, Efron M, Cornall-Reilly J, and McBride J (2010), Urbanisation and maximum temperature, Australia - New Zealand Climate Forum 2010, 13-15 October 2010, Hobart, Australia: <http://www.bom.gov.au/events/anzcf2010/abstract-189.shtml>

