

CLIMATE OBSERVATIONS

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The Australian Bureau of Meteorology maintains one of the best climate observational systems in the world. High-resolution daily gridded data sets are available for observed rainfall and screen-level air temperature, solar radiation and humidity (specifically, vapour pressure). Homogeneous records are available for rainfall, pan evaporation and daytime cloud amounts. The Bureau has also recently developed the first continent-wide homogeneous daily temperature record covering the period from 1910 onward. In this paper we present key recent trends in observed climate indicators for Australia.

Australian mean temperatures have warmed by around 0.9°C since the early 20th century, with most of that warming occurring since 1950. Sea-surface temperatures around Australia have also warmed by just less than one degree, with a more uniform warming trend since 1900.

Terrestrial warming (i.e., land temperatures, as opposed to ocean temperatures) has been more pronounced for nighttime temperatures, with trends for minimum temperatures exceeding those for daytime maximum temperatures. The approximately

linear trend in mean temperatures over the last 60 years has been accompanied by a reduction in extreme cold days and, in the last decade especially, an increase in extreme hot days. Since 1910, the ratio of warm to cold record setting temperatures has seen a pronounced shift, with days recording record warm temperatures exceeding record cold temperatures by more than 3:1 in the past decade. Warming has been more pronounced in some regions compared with others, with regional differences often related to coincident rainfall trends in those areas. In general, warming has been larger inland than near the coast.

Rainfall changes have also been apparent in some parts of the continent in recent decades. While an increase in summertime monsoonal rainfall has been enough to increase nationally averaged rainfall in the last 20 years, perhaps the most notable observed rainfall change is a reduction in rainfall over southern parts of the continent during the winter half of the year. These changes are consistent with observed changes in circulation, predominantly a trend toward higher atmospheric pressures across southern Australia.