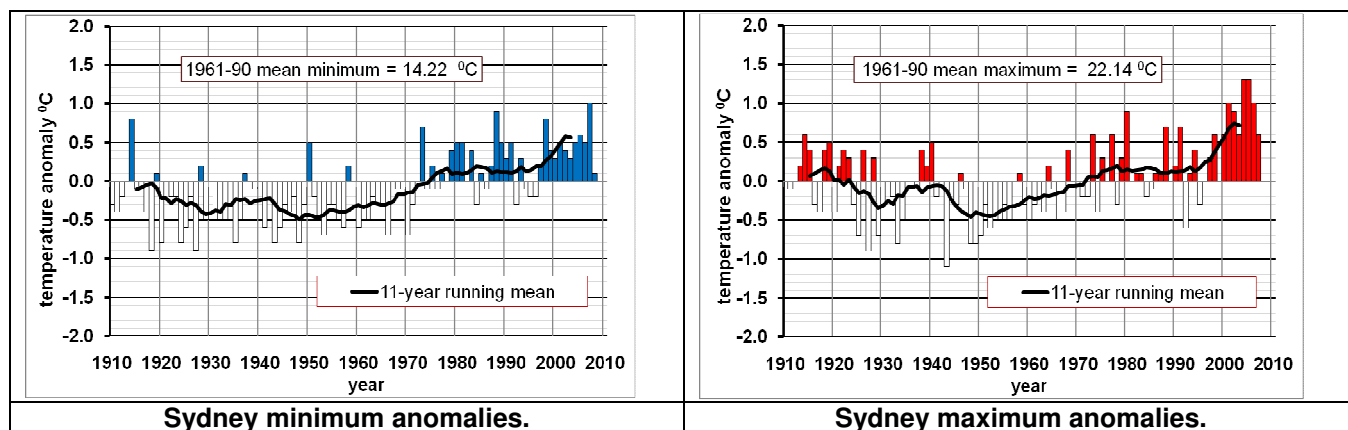


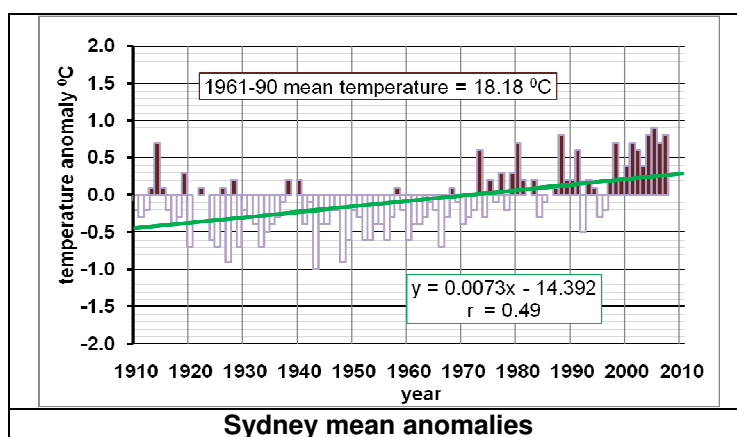
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8. Calculation of the annual mean temperatures from the maxima and minima.

In the two graphs below, we have taken the anomalies for Sydney presented on the previous page but instead of displaying a straight line of best-fit through the data points have chosen instead a different form of trend-line (known as an '11-year running mean') in order to help detect some of the subtlety on the level of about a one decade time-interval in the temperature trends (for more, see **Appendix 7** in the separate **Appendices**).



One of the features that such an analysis highlights is the dip in temperatures which occurred in the period from about 1940-1960. This is a feature of the data from many meteorological stations and is especially apparent in the maximum temperatures (see for example, Newcastle). Maximum and minimum temperatures behave differently under different synoptic conditions and have been treated separately up until this point. However, when we come to look at climate change on a larger scale such detail can obscure the broader issues. In the graph below, the maximum and minimum anomalies have been combined into one time-series – the mean anomalies. (*BOM, 2009c*)



These mean anomalies have been calculated by going back to the original annual maximum and minimum time-series. For each year, the maximum temperature (T_{\max}) has been added to the minimum (T_{\min}) and then divided by 2 (i.e. $T_{\text{mean}} = (T_{\max} + T_{\min}) / 2$). The mean values have been rounded off either down or up, as appropriate, to the nearest decimal point. The anomalies for the mean temperatures have then been calculated in the same way as the anomalies for the maximum and minimum time-series, i.e. to a base of the 1961-1990 average.

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QUESTION:

On the basis of the line of best fit in this graph, has the annual mean temperature for Sydney changed between 1910 and 2008? Increased or decreased? By how much roughly? Try using the linear equation to estimate the average change per decade (per 10 years) that has occurred since 1910.



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