Variability in Australian rainfall is dominated by a number of drivers acting on different spatial and temporal scales. Our current understanding indicates that climate change is likely to lead to an increase in rainfall in already wet regions and a drying trend in dry regions. According to the IPCC, rainfall extremes are likely to increase even in regions with a small decrease in average precipitation. However, the relationship between changes in average and extreme precipitation is not well understood. Rainfall extremes are generally studied on the basis of extreme series, such as annual maxima or partial duration series. By reducing the data in this way, potentially valuable information is discarded. This paper will discuss the use of the Empirical Mode Decomposition (EMD) to identify noise, multi-decadal variability and long-term trends in time series of rainfall data with the aim of understanding the effects of climate variations on rainfall extremes. This technique is suitable for the analysis of non-linear and nonstationary processes and may therefore be better suited to analysing long-term variability in rainfall and rainfall extremes than traditional spectral analysis techniques like the wavelet and Fourier transform. The technique of Empirical Mode Decomposition was applied to a long series of daily, monthly and annual totals as well as annual maxima of daily rainfall. The Intrinsic Mode Functions (IMF) and Residue were constructed and assessed for their significance. This information was used to pre-process (detrend, denoise) the daily data prior to extracting and analysing annual maxima.