This paper addresses an important theoretical issue, the presence of long-range dependence and/or that of breaks in the mean, which has clear practical implications, as the authors indicate.

The paper has the format of a technical note. The aim is to provide a way of testing for the presence of long memory in time-series of daily rainfall data from Malaysia. As I understand it, the original contribution of the paper does not lie in the devising of a new test for long memory, but rather in examining its suitability for daily rainfall data, with an illustration using nine series of 34 years from Malaysia.

The particular problem that the authors tackle is that of understanding the nature of the breaks in the observed time-series. There are two possibilities: (i) these could be breaks in a short memory process, so that they are just indicative of non-stationarity in the mean; (ii) alternatively they could be breaks that are generated by a long-memory process. In both cases, the autocorrelation function exhibits strong persistence.

Rather than get involved in a detailed discussion of what a long-memory process is, the authors opt for a description of it as a fractionally integrated process, such as an Auto-Regressive Fractionally Integrated Moving Average process (ARFIMA). The idea is that by applying *d* times the differencing operator to the time-series, it can be made stationary and modelled using an ARMA model. When a non-integer *d* is required, we have a fractionally integrated process.

The authors do a reasonably good job of setting the background to the study of long memory processes, although their references are rather selective: the papers selected are mostly not from the field of hydrometeorology, but from time-series analysis, in particular in finance and economics. This is a shortcoming that needs to be addressed as this is not the first time hydrological data (in particular rainfall) are analysed for their long memory properties. Seminal works by Hurst, Hosking, Rodriguez-Iturbe, Bras, and Koutsoyiannis cannot all be ignored here.

The presentation of the periodogram-based test for long range dependence is not always illuminating. For instance, equation (5) is given as an alternative form for the expression of the logarithm of the spectral density, but the reader is not told why (p.12277). Also the index *j* on the frequency ω is sometimes dropped in the equations. Moreover, the figures are apparently not all there, as the correlogram of first-order differenced data is not shown in figure 4 contrary to what the text announces (p.12279). Finally, the CUSUM test used for the break detection, based upon an F-statistic, is not presented but only mentioned in the literature review and the results section. Given its importance here, the reader should not have to consult the literature to find out about this. This may again be an issue related to the authors' usually working with financial/economic data where tests for breaks are widely used and known. So this again indicates the need to tailor this paper to its hydrological audience.

In the results/discussion section, some additional comments might be useful, e,g, about how to detect over-differencing. Also, it is not clear to me exactly what tests have been carried out. For instance we are told that, if detected breaks in the observations are real as opposed to spuriously generated by a long-memory process, this can be tested by comparing the statistical properties of

the sub-series between the breaks. But have the authors done this, and if so, what is the outcome of this analysis?

Some detailed comments:

In equation (4), if *d* is non-integer, the term $\binom{d}{r}$ is not appropriate, so it may be best to present the expression for *d* integer and then indicate that its expression as the equation below (4) allows for generalisation to non-integer values of *d*.

In the final paragraph of section 3, it is figure 5 and not figure 3 that contains the fluctuation process and the F statistics.

The fluctuation process needs to be clearly defined so the reader can understand the discussion p.12274.

In conclusion, the results of this paper are a useful contribution to the important topic of detection of long memory in hydro-meteorological processes, but the paper's current presentation does not make that contribution apparent.