

Interactive comment on “Variability of rainfall in Peninsular Malaysia” by C. L. Wong et al.

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Received and published: 8 January 2010

We thank anonymous reviewer 2 for the valid general and specific comments on the manuscript, including pointing out several inaccuracies and unclarities. Similarly, we appreciate the valuable suggestions that are raised by the reviewer.

We agree that the treatment is of a rather descriptive nature. The principal need for a rainfall data set of this extent is to use it in regional modelling of water resources. While an in-depth climatological analysis would require to study a much larger area (as in the reference to Nicholls and Wong, 1990), this study covers a fairly large region for hydrological modelling purposes. Analysis of the spatial and temporal variability of the rainfall driving the hydrological response subsequently provides useful in interpretation of the modelling results in order to assess the variability of the water resources at the

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scale of the entire peninsula. For this purpose we have applied standard statistical methods to the rainfall data.

The motivation for studying the relationship between ENSO and rainfall is to investigate whether or not ENSO indices can be of predictive value with respect to the temporal rainfall behaviour at annual scales, as is suggested in Figure 7. At decadal scales, there seems to be a pattern, as noted. Probably more interesting would be to investigate monthly or seasonal relationships, which, as pointed out by the reviewer, could then be discussed vis-a-vis the harmonic analysis results.

We agree that the manuscript needs an overhaul to improve general formulation and clarity. The issues raised in the specific comments by the reviewer are acknowledged. The reason for a broad division into three regions arises from inspection of Figure 3. The mean monthly rainfall for this limited set of stations with nearly complete records of thirty years shows marked differences in seasonal distribution, particularly between the eastern and western coasts and the central inland area. The southern part of the peninsula shows a more uniform temporal distribution. The region delineation becomes obviously somewhat arbitrary, but needs to clearly distinguish the coastal areas. The central mountain range then forms a natural boundary for the inland region, which furthermore includes some of the more isolated and smaller mountain belts. Adding shaded or contoured elevation topography to Figure 1 makes it harder to view the (three distinct) symbols used for the locations. Figure 3 displays the geographical setting of the country. However, some improvement to Figure 1 can be made by adding the major river pattern.

The daily rainfall values of all grid cells within each region were aggregated into a monthly areal rainfall time series for that region. This has been added to the last paragraph of section 3.2. Section 3.3 is improved by stating that a number of methods to identify periods of hydrological time series, such as correlogram, spectral density analysis, periodogram in connection with the harmonic analysis, and wavelet analysis (e.g. Sang et al., 2009). Only the periodogram in connection with the harmonic analysis

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can identify the significant periods, but also estimate the relative contribution of each periodic component to the total variation of the hydrological time series. Therefore, harmonic analysis is used in this paper to identify periodic changes of monthly rainfall series and to analyze relative importance of each periodic component to the variation of monthly rainfalls.

The caption of Figure 9 should read: Box plots of the monthly areal rainfall sums (left hand side) and the spatial coefficient of variation for the monthly rainfall sums (right hand side) during the analysis period for the east coast, inland and west coast regions. Other minor comments recommended by the reviewer have been carried out.

References:

Nicholls, N., and Wong, K. K.: Dependence of rainfall variability on mean rainfall, latitude, and the Southern Oscillation, *J. Climate*, 3, 163-170, 1990.

Sang, Y.-F., et al.: The relation between periods' identification and noises in hydrologic series data, *J. Hydrol.*, 368, 165-177, 2009.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 5471, 2009.