

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

Anonymous Referee #2

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- Does the paper address relevant scientific questions within the scope of HESS?

Although the general topic of the paper (spatial and temporal variability of rainfall) is relevant for HESS, the paper does not state clear scientific questions or hypotheses.

- Does the paper present novel concepts, ideas, tools, or data?

There are no novelties concerning concepts and tools. However, the compilation of the data set for Malaysia seems to be valuable. From a regional viewpoint this could be interesting.

- Are substantial conclusions reached?

The paper is rather weak in reaching substantial conclusions. I will give 2 examples:

1. ENSO influence: The analysis of the relationship between rainfall and ENSO is

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Comment

inconclusive. I miss a clear motivation for studying this relationship. On the one hand, the authors refer to a paper of Nicholls and Wong (1990) where an influence of ENSO on the relative variability was found. However, this is only mentioned in a subordinate clause, and the characteristics of this influence are not explained. On the other hand, the authors find no clear/dominant influence of ENSO on rainfall variability and say that this finding is in line with the results of MMD (2009). There are no clear hypotheses and clear conclusions.

2. Interpretation of harmonic analysis: The analysis says that there are for each region 2 dominant periodic components with annual and half-year periods. There is no attempt to interpret this result. Fig7 and Fig8 seems to show some inter-annual to decadal variability (sequences of dry or wet years). It would be interesting to discuss this phenomenon in relation to the results of the harmonic analysis.

The paper is a collection of some (more or less standard) statistical methods applied to rainfall data across Malaysia. I miss a in-depth discussion of the results and of the implications of the findings.

- Are the scientific methods and assumptions valid and clearly outlined?

The manuscript contains many inaccuracies.

- Are the results sufficient to support the interpretations and conclusions?

There are not many interpretations / conclusions.

- Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?

Since standard methods are applied, reproduction should be given.

- Do the authors give proper credit to related work and clearly indicate their own new/original contribution?

Yes.

- Does the title clearly reflect the contents of the paper?

Yes.

- Does the abstract provide a concise and complete summary?

Yes.

- Is the overall presentation well structured and clear?

Clarity has to be improved. Structure is mostly ok, however, section 4.2 is entitled 'harmonic analysis', but the most part of this section is devoted to the contributions of the monsoons to the annual rainfall.

- Is the language fluent and precise?

No. The manuscript needs an overhaul. There are many cumbersome phrases and many small errors. The English needs to be improved. Just 2 examples for missing precision and carelessness: p5475, lines 2-6: The manuscript says that rainfall data originates from 3 sources, however, 4 sources are given (DID, MMD, GSOD/WMO-GTS, GAME). P5487, line 17: There is something missing in this sentence: '...is based on the concept that the variation of the Cpi versus j.' This cannot be understood.

- Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

No. Symbols are not completely given and the manuscript seems to have some flaws. For example, in Appendix B (p5488, line 19) the authors write: '...one concludes there is no trend when $t(v, 2.5\%) < tt < t(v, 97.5\%)$ '. In their next sentence, they contradict and say that '...if tt lies within within the desired confidence limits, we can conclude that there is a trend...' Further points are given in 'specific comments'.

- Are the number and quality of references appropriate?

Yes.

SPECIFIC COMMENTS:

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P5476, line2: Please define r . If $r_0 = 1$, why do you need it? Please describe how x_0 is set. Do you derive x_0 from the empirical correlation between the daily station precipitation?

P5476, line17: What are the reasons for choosing $nj=10$, $m=4$?

P5477, section3.2: Why do you form regions? Please give the motivation for pooling the precipitation stations into regions.

P5477, section 3.2: Are the precipitation patterns of the 3 regions significantly different? Did you use some statistical test or cluster approach or anything else?

P5477, section3.2: How are the boundaries of the 3 regions derived? Given that the difference in the rainfall patterns of the 3 regions seems not too large, how did you decide where to draw the boundary between, eg, region west and region inland?

P5477, line 1: Please give the period (eg in Fig3) for which the monthly and annual values are computed.

P5477, line15: Please delete the last paragraph of section3.2, or move it to the beginning of chapter 3 where you could briefly mention the applied methods.

P5477, section3.3: There are a number of methods for analysing time series, and in particular, period components. Please give a motivation for the choice of harmonic analysis.

P5478, line18: I do not understand this sentence. When the significance level is given (here 5%), then its influence on the test statistic is fixed.

P5479, line4: Please define n .

P5479, section4.1: Please make clear that the variability shown in the whisker plot represents the inter-annual variability of the monthly rainfall totals.

P5480, line1: You speak about harmonic analysis of gridded time series, however,

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Interactive
Comment

the results are shown for the 3 regions. Have all grid cells within one regions been aggregated to one single (composite) time series, representing the respective region? Please explain what you have done.

P5482, line12: I suppose that this statement (El Nino → warm, dry, La Nina → cold, wet) is related to Malaysia. Then this should be said explicitly.

P5482, line15: There seems to be a mistake: 1988 is given as La Nina year in Fig7.

P5483, line7: I do not understand this sentence.

P5486, line9: I am confused by your definition of n, t. Why is the total number of observations in a monthly time series equal to 12 ? Is t really the time interval ?

P5488, line11: what is K xi, k yi ?

P5495, Fig1: It would be helpful to see the topography in this figure, in order to get a better idea of the geographical setting.

P5496, Fig2: I propose to merge the observations from MMD and GAME, since (1) this distinction is not made in Fig1 and (2) MMD and GAME can hardly been seen in the current figure layout.

P5498, Fig4: Please merge the 3 sub-figure into one figure with different shading for the 3 regions. Then one could more easily grab the areas which are not covered by the analysis.

P5500, Fig5: What is shown on the x-axis? Fig5 is too small to be seen. Maybe, you could show only a part of the whole time series, in order to better see the fit between observation and fitted harmonics.

P5503, Fig9: What is given in the right column of Fig9 ? Is this the spatial coefficient of variation for monthly rainfall totals ? Please give a unambiguous explanation.

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