

Interactive comment on “Probable Maximum Precipitation Estimation in a Humid Climate” by Zahra Afzali Gorouh et al.

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Probable Maximum Precipitation Estimation in a Humid Climate The authors wish to thank the editors and reviewers for their time in effort in reviewing our manuscript. We hope the changes listed have made the manuscript suitable for publication and we look forward to your response.

_____ Response
to Reviewer: P1L12: At first, define the variable and then use the abbreviation (e.g.
frequency factor; Km). Re: Required description was added to the text. _____

_____ P2L14-17:
Too many citations..., without commenting their research Improve the syntax of the

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sentence. Re: This sentence was corrected. _____
_____ P3L16: ... of 33 years ranging from
... Re: It was corrected. _____
_____ P4L4&5: Improve the syntax of the sentence. Re: It was
corrected. _____
_____ P5L22: Previously, you have mentioned that K_m is replaced by Kenvelope
value. Now you use equation 5. Please clarify this point. Re: It was first thought that
 K_m was independent of rainfall magnitude, but it was later found to vary inversely with
rainfall: the value of 15 may be too high for areas of generally heavy rainfall and too low
for arid areas.” Because of the study area is a wet area, the value of K_m for wet areas
is too high, and therefore revised approach was used to obtain the appropriate value
of K_m . In order to calculate the K_m , the equation 2 was used. Then the maximum
value of K_m was considered as K_m -envelope and was used to calculation of PMP24.
The K_m values in standard approach were obtained from Equation 5, based on 24-h
 K_m chart (WMO, 2009; Hershfield, 1965). These curves obtained from 2700 stations
over the USA, while in revised approach, frequency factor was obtained from observed
rainfall over the study area and stations. The frequency factor in revised approach is
more reasonable, for it was obtained based on real occurred rainfall over the study
area and the result of corresponding PMP is closer to real occurred rainfall over the
study area. Reduction of K_m in revised approach is not a reason to refuse standard
approach; this shows that the standard approach estimates the PMP with more caution
while estimating appropriate value of K_m is leading to decrease the cost of structures
that affected by PMP. _____
_____ P6L2: Discuss the differences between the two approaches.
Re: The second approach is based on the first approach theory. The main difference
between these approaches is K_m . in the first approach; K_m was obtained from the
empirical chart, while in the second approach K_m is obtained from the actual rainfall
in each station and considers the maximum value of K_m as a regional value of K_m
for all stations. _____

————— P6Section3-2: The authors should provide the Spatial distribution of rainfall PMP24 based on physical method, as they have done regarding the other two statistical procedures. Re: The spatial distribution of PMP24 based on physical method was followed by the Spatial distribution of storm that occurred at 10/29/1993. Also, physical PMP result is an average depth for basin. Figure shows the spatial distribution of storm 10/29/1993. (Fig 1 attached.)

— P8L1: Improve the syntax of the sentence. Re: The sentence was revised.

— P8L1-6: This a repetition found also in section "Material and Methods" Re: The sentence was revised.

————— P8L23: The authors should provide statistical metrics such as R2, RMSE, MAE and probability of detection (POD), false alarm ratio (FAR) and critical success index (CSI). These metrics are important to verify the results obtained by the two applied procedures. Re: Common criteria for rainfall such as (MAE, MSE, RMSE, MAPE, R(XY), and R2 was added to the text. Other criteria were not used because it was used for radar-based rainfall. Even based on performance criteria including MAD, MSE, RMSE, MAPE, R, and R2, physical method is more accurate than statistical method and revised approach is better than standard approach. Corresponding values of these performance criteria are mentioned in table 1 (attached)

Thank you again for your time and effort and for helping us to improve the manuscript.

Please also note the supplement to this comment:

<https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2018-38/nhess-2018-38-AC4-supplement.zip>

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2018-38>, 2018.

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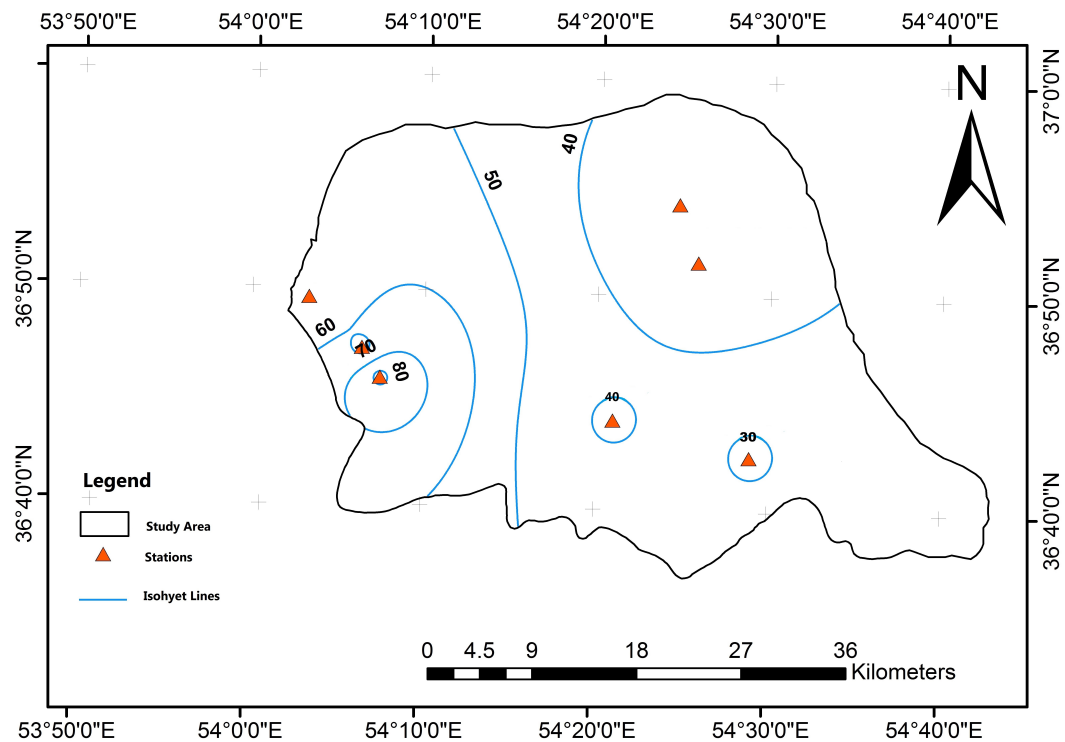


Fig. 1. Fig 1

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Statistical comparison between $(P_{24})_{\max}$ and estimated PMP_{24} values

method	MAE	MSE	RMSE	MAPE	R(XY)	R ²
Standard	258.2	69090.5	262.9	241.7	0.8	0.63
Revised	64.36	4311	65.7	61.2	0.9	0.86
Physical	7.1	50.4	7.1	4.7	-	-

Fig. 2. Table 1

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