

Date: 11-08-2025
To: "CIRA ETHEOWALDA GUEVARA OTINIANO" ciragotiniano@gmail.com;cira@unb.br
From: "TEST Editorial Office" Narmadha.Purusothaman@springer.com
Subject: SEIO: Your manuscript entitled A simple and useful regression model for bimodal extreme data]{A simple and useful regression model for bimodal extreme data.

Ref. :
Ms. No. SEIO-D-25-00070
A simple and useful regression model for bimodal extreme data]{A simple and useful regression model for bimodal extreme data.
TEST

Dear Dr OTINIANO,

Reviewers have now commented on your paper. You will see that they are advising that you revise your manuscript. If you are prepared to undertake the work required, I would be pleased to reconsider my decision.

I am particularly worried about the general comment from one of the referees questioning about the arbitrariness of the procedure compared to more explicit methods to handle bimodality as for instance by means of introducing covariates or with mixture models.

The reviewers' comments can be found at the end of this email or can be accessed by the provided link.

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When revising your work, please submit a list of changes or a rebuttal against each point which is being raised when you submit the revised manuscript.

Your revision is due by 09-11-2025.

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Thank you very much.

Yours sincerely

Gonzalo García-Donato
Editor-in-Chief
TEST

Reviewers' comments:

Reviewer #1: Please see attached report.

Reviewer #2: Please see the attached report.

Reviewer #3: General comment

When bimodality in extreme data arises, it is usually due to some covariate that can explain it. If the covariate is not explicitly available, it would make sense to use a mixture model to identify the two underlying distributions each having a single mode. In general, it would be better to identify the reason for the bimodality (covariate, mixture...) instead of using a relatively arbitrary construction of a binomial distribution that does not have any theoretical motivation from Extreme-Value Theory, by contrast with the classical GEV distribution.

While I am generally not convinced by the bimodal distribution approach, I acknowledge that the inference methods look sound and the simulation study is useful. The R package is also an advantage for reusability.

Major points

In your application, it would be interesting to see if the untransformed residuals of your regression model still have bimodal structure. Otherwise, you would not need a bimodal model. From the exploratory plots, it seems that the S-covariate could explain the bimodality in the raw data. You should show histograms of these untransformed residuals to confirm that there still is bimodality after including the covariates.

Moreover, to further confirm the utility of the BGEV here, I also suggest to fit the classical GEV distribution (with the same specifications) and compare its AIC values to the ones of the BGEV. You could put the covariates in the location parameter of the GEV, or in its median, similar to what you are doing with the BGEV.

Some minor comments

The motivation for the approach for climate data is written in a confusing way. For example, the first sentence of abstract. It does not make sense. You could say that "Extreme weather events OFTEN result from... ", but you cannot make the general statement you wrote.

p2 l3 "In most cases,..." No! Bimodality in maxima data is quite rare (and I've been working on them for 15 years), or it is due to some covariate or latent variable that you should try to identify.

p2 l4 "Mix of maximum with minimum values" Why would you want to mix these two? This does not make sense.

p2 l15 " extremes of climate variables are expressed by changes in the location parameter of the distribution" You mentioned stationarity in the preceding sentence, so this is confusing.

p24 l1 "stations" should probably be "seasons" here?

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There is additional documentation related to this decision letter. To access the file(s), please click the link below. You may also login to the system and click the 'View Attachments' link in the Action column.

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