

Geosci. Model Dev. Discuss., author comment AC1  
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## Reply on RC1

Ji Li et al.

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Author comment on "A physically based distributed karst hydrological model (QMG model-V1.0) for flood simulations" by Ji Li et al., Geosci. Model Dev. Discuss.,  
<https://doi.org/10.5194/gmd-2021-120-AC1>, 2021

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A point-by-point reply to the comments

Anonymous Referee #1, 20 Sep 2021

The paper concerns a topic consistent with the aim of the GMD journal, and I really appreciate the huge work made by the authors. The presented analysis and model application could be potentially useful in karst basins. In this study, a karst hydrological model, i.e., the QMG model-V1.0 was developed for karst floods simulation and forecasting. The model itself is a valuable improvement, and what interested me was the applicability of the model in karst areas, so I went through the entire process of modeling and validating the model myself (<https://zenodo.org/deposit?page=1&size=20>), and the model simulation results were satisfactory. I think the subsequent research should focus on the validation study of the model in more karst areas to prove its general applicability in karst hydrological forecasting. However, there are few drawbacks affect the manuscript and have to be addressed before the paper can be published in GMD.

Specific comments

### 1) English needs modification

I found several incorrect words, grammar and unclear sentences, make it very difficult to understand the analysis carried out and the results obtained. The authors need to carefully correct the language errors in the whole text.

2) More information about the potential of this new model, ie.e., the QMG model-V1.0 for application in karst areas needs to be added in the Introduction part, especially the advantages and disadvantages compared to current numerical karst groundwater models.

3) In the Methodology part, the section 3.1 Hydrological model, this title is inappropriate here, as it obviously also includes the Parameter Optimization in Section 3.2 and Model Setting in 3.4. Suggest changing it to a model framework and algorithm.

4) In section 3.3 Uncertainty Analysis, it is not clear how to analyze uncertainty in input data and model structure for this new QMG model-V1.0.

Other minor comments

- 1) All tables should be set to three-line tables.
- 2) The right side of Figure 3 seems to be a photograph, please explain the necessity of its existence.
- 3) Each variable in Figure 5 needs to be clearly labeled as to which parameter it refers to.
- 4) The horizontal axis in Figure 7 represents the date, but the interval is not one-to-one with the marked time, please check that.

**General comment:**

The paper concerns a topic consistent with the aim of the GMD journal, and I really appreciate the huge work made by the authors. The presented analysis and model application could be potentially useful in karst basins. In this study, a karst hydrological model, i.e., the QMG model-V1.0 was developed for karst floods simulation and forecasting. The model itself is a valuable improvement, and what interested me was the applicability of the model in karst areas, so I went through the entire process of modeling and validating the model myself (<https://zenodo.org/deposit?page=1&size=20>), and the model simulation results were satisfactory. I think the subsequent research should focus on the validation study of the model in more karst areas to prove its general applicability in karst hydrological forecasting. However, there are few drawbacks affect the manuscript and have to be addressed before the paper can be published in GMD.

**Response:**

We greatly appreciate the reviewer's comments. The reviewer confirmed the innovation and application value of this study and pointed out the potential of the model (QMG model-V1.0) proposed in karst areas, and suggested that subsequent studies should focus on applying this new model to more karst areas to test its general applicability in karst floods forecasting.

The next step of our research is indeed focused on model validation, for which we will build this model (QMG model-V1.0) for flood simulation and forecasting in more karst areas, and improve the model's functions and algorithms to provide its applicability and accuracy based on the application effects.

The following is our point-by-point response to specific comments.

**Specific Comment**

- 1) English needs modification

I found several incorrect words, grammar and unclear sentences, make it very difficult to understand the analysis carried out and the results obtained. The authors need to carefully correct the language errors in the whole text.

**Response:**

We have carefully revised the language errors in the full text, including incorrect words, grammar and unclear sentences, and asked a professional English editing company (Charlesworth Advanced ) to help fix the language problems in the manuscript.

- 2) More information about the potential of this new model, i.e., the QMG model-V1.0 for application in karst areas needs to be added in the Introduction part, especially the advantages and disadvantages compared to current numerical karst groundwater models.

**Response:**

More information about the advantages of the QMG model-V1.0 compared with other karst groundwater models have been added in the revised Introduction (Lines 103-115).

3) In the Methodology part, the section 3.1 Hydrological model, this title is inappropriate here, as it obviously also includes the Parameter Optimization in Section 3.2 and Model Setting in 3.4. Suggest changing it to a model framework and algorithm.

**Response:**

This advice is very pertinent. The title of section 3.1 has been replaced by "Hydrological model framework and algorithms" accordingly (Lines 205).

4) In section 3.3 Uncertainty Analysis, it is not clear how to analyze uncertainty in input data and model structure for this new QMG model-V1.0.

**Response:**

Uncertainty Analysis of input data and model structure have been added in the revised section 3.3 (Lines 428-446).

Other minor comments

1) All tables should be set to three-line tables.

**Response:**

The tables have been set to three-line tables accordingly (Lines 938-943).

2) The right side of Figure 3 seems to be a photograph, please explain the necessity of its existence.

**Response:**

It is a three-dimensional spatial model of KHRUs established in the laboratory to visually reflect the storage and movement of water in the karst water-bearing medium with each spatial anisotropy, and to provide technical support for the establishment of hydrological model. And this description has been added to the revised version (Lines 230-233).

3) Each variable in Figure 5 needs to be clearly labeled as to which parameter it refers to.

**Response:**

The model parameter referred to by each variable in Figure 5 has already clearly reflected in Table 1 (Lines 938).

4) The horizontal axis in Figure 7 represents the date, but the interval is not one-to-one with the marked time, please check that.

**Response:**

The horizontal axes in Figure 7 have been revised accordingly (Lines 965-977).

Please also note the supplement to this comment:

<https://gmd.copernicus.org/preprints/gmd-2021-120/gmd-2021-120-AC1-supplement.zip>