Response to Reviewer 1

Thank you for your thoughtful reading and comments, the authors have benefited from your meaningful suggestions. We have made revisions based on your comments. The parts of the article that were revised we have marked in blue.

Comment 1: The novelty proposed by the proposed work is clearly explained in the introduction and consists in the improvement of the ROPAR procedure by introducing multivariate uncertainty analysis by copulas. Nevertheless, I would suggest avoiding bulleted lists to introduce discretional topics such as in lines 75-80.

Response: Thank you for your comment. We have revised the part as following: To the best of our knowledge, the presented versions of the ROPAR methodology have the following limitations:(1) ROPAR method has not been applied to the field of WRA; (2) ROPAR method only considers the single source of uncertainty: if there are two sources, then the joint probability of these sources needs to be considered; (3) ROPAR method only analyses the variability of one objective under conditions where the other objective function level is fixed. Although the ROPAR method can provide decision-makers with a robust solution under certain conditions, it does not take into account the relationship between the two objective functions.

Comment 2: Please, avoid unnecessary paragraphs, such as line 88.

Response: Thank you for your comment. We have revised the part as following: The following text is structured as follows. First, the definition of robustness is presented. Then, the water demand and inflow in the study area was analyzed. Then, the steps of the CM- ROPAR algorithm and the water resources allocation model are described in detail. In addition, robustness criteria are chosen to analyze the robustness of the two objective functions separately. Finally, the applicability of the CM-ROPAR procedure is illustrated on a case study of the Huaihe River Basin (HRB).

Comment 3: In general, avoid abusing acronyms, especially the lesser-used ones, as they impede fluent reading.

Response: Thank you for your comment. The authors thought that we could not always use the abbreviation for Huaihe River Basin because many foreign readers do not know about Huaihe River Basin, so the authors changed the all HRB to Huaihe River Basin. For the Robustness Criteria(RC), they are used in many places in the paper, and if the full name is used, it may reduce the readability of the paper.

Comment 4: What is the function of a figure if it is not described in the text? Where is the flowchart proposed in Figure 1 described? The structure of the paper needs to be supported by the various section references.

Response: Thank you for your comment. The original intent of the authors of this part is to introduce the remaining chapters of the article. The flowchart here is that of the CM-ROPAR algorithm, which is clearly inappropriate here. The authors have revised the passage as follows: First, the Chapter 2 presents the methodology of the paper. It mainly includes the method of Copula function, the method of CM-ROPAR algorithm, the definition of robustness and the construction of water resources allocation model.

Then, the Chapter 3 introduces the overview of the study area. Then, the Chapter 4 introduces the application examples of CM-ROPAR algorithm, and this paper is an example of water resources allocation of Huaihe River Basin. Finally, the last Chapter introduces the conclusion of the paper.

Comment 5: It would be preferable to maintain a more consonant structure of the manuscript, introducing the case study after the methodology..
Response: Thank you for your comment. The authors have changed Chapter 2 to Methodology and Chapter 3 to Case Study.

Comment 6: Line 120: "Copula functions are mainly classified into Archimedean, elliptic, and quadratic types." I don't think this statement is true, who states this? There are other widely used copula classes.
Response: Thank you for your comment. The authors wanted to express that the basic Copula functions are mainly categorized as Archimedean, elliptic, and quadratic types. However, more than these three are widely used nowadays, for example, the Vine Copula function is also widely used. The authors have revised the passage as follows: The basic copula functions are mainly classified into Archimedean, elliptic, and quadratic types.

Comment 7: Section 3.1 describes a general copula analysis without any reference about the proposed work and use of copulas in the analysis.
Response: Thank you for your comment. The authors here refer to the 2008 work by Nelson et al. for an introduction to basic Copula function principles. For a reference to the use of copulas, this paper describes how to apply Copula functions to wet and dry encounters in section 3.1.

Comment 8: Line 150-153. The introduction of the uncertainty through a normal distribution with mean 1 and sd 0.05 is not clear. Why this distribution and these values?
Response: Thank you for your comment. Here is just a case study, other researchers can also set up other distribution forms if they need to use the CM-ROPAR algorithm. Generally speaking, normal distribution is widely used in hydrology fields, and other researchers can set other mean and sd. The authors have revised the passage as follows: As mentioned before, the uncertainty variable is obtained from the normal distribution $N(\mu, \sigma^2)$. Assuming that the uncertainty variable follows $N(1,0.0025)$,this represents that a 99.74% probability of the uncertainty variable falling within the interval $[0.85,1.15]$ and the inflow sample falling within the interval $[0.85 * Q, 1.15 * Q]$.

Comment 9: The list proposed from lines 143 to 171 is not properly explained. Avoid the technical list without proper explanation, please include the text in paragraphs describing comprehensively the procedure.
Response: Thank you for your comment. The authors have improved the presentation by using a more generalized formulation. Especially in the sampling section, we give more generalized cases.

Comment 10: The methodology needs to be rewritten and presented in a less confusing way and commented on more comprehensively.
Response: Thank you for your comment. The authors have refined this section of the methodology. The first is the structure of the methodology. The authors added a section introducing the principles of drought-wet encounters. Second, the authors rewrote the methodology to be more generalizable.

Comment 11: Even if NSGA-II algorithm is a well-known optimizer, please provide more information about the setup of this algorithm, population size, generation, etc.
Response: Thank you for your comment. The authors have revised the passage as follows: In this study, the population size is 100, generation is 1000, cross rate is 0.9 and mutate rate is 0.2.

Comment 12: The main drawback of the proposed methodology is the lack of flexibility due to the severe limitation such as the number of uncertainty and the object function that can be included in the analysis, both equal to two. Flexibility and easily interpretabilityare crucial characteristics in the decision-making process, for this reason, I would like to know how the authors should overcome this limit and generalise the proposed methodology.
Response: Thank you for your comment. The authors believe that your comment is very meaningful. For the CM- ROPAR algorithm, it is not necessary that the uncertainty variable and the objective function are both 2. The objective function can be two or three or more. The number of uncertainty variables we tested 1 uncertainty variable and 2 uncertainty variables. Testing more than two uncertainty variables and more than two objective functions is our next step work.

Comment 13: Finally, I suggest mentioning in the conclusion a summary of what comes out from the case study analysis. It could be a benefit for highlighting and quantifying the actual pros of the new proposed methodology.
Response: Thank you for your comment. The authors have added a summary of the case studies to Chapter 5 to highlight the superiority of the methodology. The authors have revised the passage as follows: In terms of the study cases in this paper, there is a competitive relationship between the robustness of the two objective functions, which can form a Pareto frontier. For the water deficit rate, the robust solution outperforms the deterministic solution by 53%, 59%, 162%, and 1167% for the four robustness criteria, respectively; for the pollutant emission, the deterministic solution outperforms the robust solution by only 17% for $RC1 - RC3$, and outperforms the robust solution by 137% for $RC4$. For the composite robustness, the robust solution outperforms the deterministic solution by 52.6%.