

## ***Interactive comment on “A global water scarcity assessment under shared socio-economic pathways – Part 2: Water availability and scarcity” by N. Hanasaki et al.***

**Anonymous Referee #2**

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The paper presented by Hanasaki et al. concerns the second part of a two-part paper. The model is state of the art, well documented and available in the literature. The scientific contribution of this paper is significant and the topic relevant for HESS. The methodologies used are scientifically state of the art.

However, I have some general comments on the paper:

1. the paper is too long. As it is part of a 2-part paper, the reader already has to go through a lot of information. The introduction e.g. can be shortened. Also a literature review on global water scarcity assessment (section 2.1) is totally unnecessary in this

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context. In general the paper should be presented in a more structured way, coming more to the point and avoiding too much unnecessary information.

2. The structure of the paper is confusing for the reader. As an example, please delete section 2.1 and move section 2.2 to the methodology. Why are there also 2 different parts (sections 4 and 5) for the results? this is confusing. Why is the WWR index discussed under section 4 not 5 although the CWD index is discussed in both?

3. The current version of the paper gives confusion on the water scarcity indices used. In the abstract it is noted that the CWD index is used. However, in the results both WWR and CWD results are presented. In the conclusions it is indicated that both indices were analyzed.

4. The authors indicate the new CWD approach. Within the manuscript they often state that this index is new, giving the impression that it is presented in this paper for the first time. In the current section 2.2 they however indicate that this CWD was already presented in Hanasaki et al. (2008), 5 years ago. In the paper Hanasaki et al. (2008) this index is also explained in much more detail and better understandable than in the current paper.

5. I am confused about the methodology leading to WWR results. As I understand from Figure 1 and the accompanying text in the methodology, water is withdrawn to fulfill municipal, industrial, and agricultural water demand. This demand is however only CONSUMPTION, as no return flows or losses are accounted for in the model. Water is only withdrawn from the rivers. For agriculture the model calculates irrigation consumption, for industry and municipalities a factor 10 and 15% from withdrawal are used. The model thus computes river withdrawals for water consumption. These are the factors needed to compute the CWD index. But how can the model then compute the WWR index, which normally is the ratio of water withdrawal (not consumption) to availability. Or do the authors mean water withdrawal to be water consumption?

6. With respect to the latter point 5, there needs to be a consistent use for the terms

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water withdrawal, water use, water demand and water consumption. As the manuscript is written now, a lot of confusion is generated on this terms. As I understand it water demands/water use refer only to CONSUMPTION, also for industries and municipalities. In that case this should be explicitly noted in the abstract and conclusions. the part on the indices - to be moved to the methodology - should be much clearer. How water consumption for industries and municipalities is computed is stated only once in the text, i.e. section 3.3., and not even mentioned in the description of the water scarcity indices(index?)(current section 2.2) and the H08 model (current section 3.1).

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