

## ***Interactive comment on “Economic impacts of drought risks for water utilities through Severity-Duration-Frequency framework under climate change scenarios” by Diego A. Guzmán et al.***

**Diego A. Guzmán et al.**

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Received and published: 14 June 2018

Dear editor and reviewers,

We thank you very much for the valuable comments and suggestions about our manuscript “Economic impacts of drought risks for water utilities through Severity-Duration-Frequency framework under climate change scenarios” in HESSD (Hydrology and Earth System Science Discussion). We performed a careful revision to make all suggested changes and we believe the manuscript is now much improved. Please

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check if you are happy with the new version and let us know if you have any further questions or additional suggestions. You will find in blue the responses to each comment below. All changes to comply with the reviewers’ suggestions were highlighted in yellow in the manuscript. Yours sincerely,

Diego Alejandro Guzman Arias Corresponding author

Anonymous Referee #1 (Received and published: 11 March 2018) Provide more detailed discussion on:

1) Discussion of issues or uncertainties in pre-existing methods and techniques used, both those that are known (upfront, in the methods) and those that are newly found in interpretation (in the discussion).

In the restructuring of the document, a sub-chapter was included in Results and discussions “4.4 Considerations on Uncertainties”. Lines 563-595.

2) Justification of any new methods, techniques or assumptions that are made.

In the chapter “3.3 Water price and Hydrological drought relationship” the main assumptions of the method were established, all the changes and new stretches are highlighted in yellow.

3) In the discussion; the overall most tenuous assumptions, and therefore ultimately the greatest caveats and uncertainties, that need to be considered when basing practical decisions on this study.

The new chapter “4.4. Considerations on Uncertainties” addresses the main sources of uncertainty in our work flow, shortly the uncertainties in the modeling chain (climate-hydrology) and the socio-economic considerations (water demand, water tariff policies, water supply system operation). The uncertainties of the modeling chain have been extensively addressed in the scientific literature, and we gathered main points and useful references; whilst the considerations on the study case, i.e. on economy factors and the water supply system are less general. As mentioned in the chapter, we considered

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the current reservoir operation, water tariff policy and state water use policy, all of which affect the SDF curves and also the pricing strategy during a drought event. Therefore applications with same objective, even in different cases would face these uncertainties. With that information in hand, or prospected ones, however, the methodology is versatile to respond to these configurations. Additionally, our considerations added in the Conclusions and recommendations, lines 665-660 support the usefulness of this methodology for planning in the long-term, but our developments did not consider long multi-year droughts, in which diverse less secure strategies could take place during the event, for example implementing quickly, at a great cost, and less robustly alternative water sources, which fall outside our considerations for supply and would bring further consequences on water tariff strategies.

4) A research agenda that provides new insights into what specifically would need to happen to make studies such as this more suitable for decision makers. Lines 646-654 in conclusions and recommendations, a work agenda for future research is proposed.

At face value, I found it hard to believe that water utility profit loss could realistically reduce regional GDP by as much as 10%. If that were the case, than would that not imply that the utility is one of the main employers? Presumably that level of loss would well exceed the company's capacity, sending it bankrupt well before that, leaving the government to deal with the fallout, and moving the scenario beyond your assumptions? As I said I am not an economist, but something seems not quite right there. We appreciate the comment, this was perhaps a big typing error (millions for billions). On re-structuring text, the paragraph was removed from the abstract, corrected and relocated to results. This was done, seeking to give a more general and less regional connotation to the results as suggested by the reviewer (lines 495 to 502).

The English is generally very readable but a few issues occur more than once: The document was reviewed by a person with English as their native language.

\* Long sentences with unnecessary clauses (e.g., p1, l15-17). Please try to shorten

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and simplify such sentences without using clauses where possible.

Modified text within the body of the abstract (p1, l13 to l35) and in other sections of the text through the grammatical revision.

\* Poor word choice. For example, 'to prioritize' (p1, l11) is a mental activity by (in this case) people, and cannot be done by phenomena. Also, do 'establishments' (p3, l91) relate to households or businesses?

Modified text within the body of the abstract (p1, l13 to l35) and in other sections of the text through the grammatical revision. About the word "establishments" this refers to the economic impacts on several sectors that depend of water for its operation, as can be households, business and industrial; this can be verified in Marengo et al., 2015 "A seca e a crise hídrica de 2014-2015 em São Paulo". In the text it was clarified (p3, l84).

\* Inconsistent form (single/plural) between noun and verb (e.g., p1, l20)

Modified text within the body of the abstract (p1, l13 to l35) and in other sections of the text through the grammatical revision.

\* Incorrect combination of verb and preposition (e.g. p1, l31 should be "associated with")

Modified text within the body of the abstract (p1, l13 to l35)

Most of these would likely be picked up in proofreading by a native English speaker.

Please also note the supplement to this comment:

<https://www.hydrol-earth-syst-sci-discuss.net/hess-2017-615/hess-2017-615-AC2-supplement.pdf>

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2017-615>, 2017.

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