

## ***Interactive comment on “Stochastic approach to analyzing the uncertainties and possible changes in the availability of water in the future based on a climate change scenario” by G. G. Oliveira et al.***

**G. G. Oliveira et al.**

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Dear Reviewer, first we would like to thank you for reviewing the article. We greatly appreciate you for your valuable comments and suggestions. The comments are very helpful for revising and improving our paper. Thus, all requests were answered (see below).

Questions:

1. Page 3788: gases which have implications on thermal energy.

Comment of the authors: We agree with your suggestion.

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See changes in the manuscript: - Page 02, Lines 03-05.

2. Page 3789: 5-10: IPCC (2013, 2014), current global climate is warmer than pre-industrial period Shown be increasing trend of surface temperatures of the earth Negative impacts Which makes them attractive in simulation of the physical climate system.

Comment of the authors: We agree with your suggestion.

See changes in the manuscript: - Page 02, Lines 12-15.

3. Page 3790: 10-20: It is better to drive the Eta model with HadCM model RCP scenarios like 4.5, 8.5 or 2.6 rather than the scenario A1B which might be obsolete currently.

Comment of the authors: Thank you for the comment. First, it is important to emphasize that the selection of climate change scenario was made at the beginning of a research project that originated the doctoral thesis (2010-2014) of the first author of this study. At that time, the new IPCC scenarios, for the AR5, were not yet available. Furthermore, all the data from the climate model Eta CPTec were provided by the National Institute for Space Research (INPE). This agency has recommended the use the A1B scenario in four versions with different sensitivities. These versions were already being examined in another spatial scale, in large areas of the South American continent (example: Marengo et al., 2012). Therefore, given this context, we decided to evaluate these scenarios in more detail scale to analyze the impacts of climate changes in medium and small river basins of Brazil. Furthermore, although the A1B scenario is not the more appropriate since the release of the IPCC AR5, it does not compromise the present study, which aims at a methodological approach based on stochastic models. That is, the main purpose of this study is to investigate the possibility to evaluate changes in the water availability using only one climate scenario, by generating synthetic flow series. The main contribution of this study is to show one way in which climate data can be processed to obtain results related to climate impacts on water resources.

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See changes in the manuscript: - Page 05, Lines 15-23.

4. Page 3793: daily climate data should actually be daily weather observations.

Comment of the authors: We agree with your suggestion.

See changes in the manuscript: - Page 06, Line 13.

5. Page 3793: annual rainfall is 1750mm which occurs within 115 days during the year.

Comment of the authors: We agree with your suggestion.

See changes in the manuscript: - Page 06, Lines 15-16.

6. Page 3807 to Page 3817: Results and discussion should be improved to attract readers. For example Section 3, Results and discussion. The first statement " This item will . . ." Re-write as "This section . . ." It is not ideal to have sub-sections in discussion with sub-titles like "Analysis..", e.g. "3.1 Analysis of stochastic . . ." Change to "3.1 Monthly flows". "3.2 Analysis of changes and uncertainties . . ." Change to "3.2 Changes and Uncertainties . . ." The discussion is heavy and there is intensive use of "single precision real numbers" and even percentages to decimal point. So many numerical values in article make it non-attractive. Avoid numerics as far as possible and bring out the key points narratively. There are good Figures and tables in the manuscript, but in most cases, diagram Figure and/or table are referred by simply brackets (Examples Pg 3808 Line 2 ".....discharge (Fig.3), Pg.3817 Line 14 ....higher (Fig.15)". Same applies to tables e.g. Pg 3808 Line 9 "...0.52% (Table 2)."). This tends to suggest that the figures and tables are not relevant. Figures and tables are for purpose of strengthening the main points and there should be statements like "Figure 3 illustrates volume discharged in ... This result there reveals that .....". I recommend re-writing of this section with inclusion of statements like above, with avoidance of numerics. Graphs and tables can be referred to directly within the discussion to improve the attractiveness of the article.

Comment of the authors: We agree with your suggestions and considering their rele-  
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vant comments to improve the quality of language in this section of the paper, we made some changes in the manuscript as shown in the list below.

See changes in the manuscript: - Page 18, Line 14. - Page 18, Line 17. - Page 18, Lines 21-24. - Page 18, Lines 27-30. - Page 19, Lines 03-05. - Page 19, Line 12. - Page 20, Lines 04-10. - Page 20, Lines 14-22. - Page 20, Line 27. - Page 20, Lines 29-31. - Page 21, Lines 01-02. - Page 21, Lines 06-09. - Page 21, Lines 21-24. - Page 21, Lines 26-29. - Page 22, Lines 18-31. - Page 23, Lines 01-11. - Page 23, Lines 26-30. - Page 24, Lines 03-13. - Page 24, Lines 21-24.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/12/C1937/2015/hessd-12-C1937-2015-supplement.pdf>

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