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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Projections of the Affluent Natural Energy (ANE) for the Brazilian electricity sector based on RCP 4.5 and RCP 8.5 scenarios of IPCC-AR5" *by* C. da Silva Silveira et al.

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1. "My first remark regards the method used to estimate ANE in the 167 basins/points where the model is not run (as already mentioned by Referee #1)".

a. We used one or more stations to represent each one water basin and then we regionalize the streamflow for the other stations. These 167 basins are considered sub-basins or have a very close behavior of the representative station.

2. "First of all, authors should clearly discuss why they did not use the model in all basins considered. Is this because input or evaluation data are missing? Is it because

computational times are too high? . . . why the linear regression are assume valid for future climate. "

a. They have the same atmospheric system and climatology.

b. Our hypothesis is the climate change modify intensity and frequency of the climate system occurrence, however it does not change the main rainfall system for each climate regions in Brazil.

c. In addition, see 1.a.

3. "In the literature, a large amount of strategies is available to cope with the spatialization of input data or parameters (e.g., regionalization). I think that this analysis would clearly benefit from including the entire domain of the study in a unique simulation. According to my opinion, this methodological issue is the most important point to be addressed in the revised manuscript."

a. The spatial structure is provided by the precipitation field from the climate change global models.

b. Entire domain was covered by the twenty-one reference stations. There is a high correlation among the reference and remain stations.

c. The uncertainty from the climate change global models is higher than streamflow regionalization uncertainty using regression modeling.

4. "Another key issue of this manuscript is its lack of important details about all modelling steps. . . ."

a. We agreed with the referee and will incorporate the answers of all the questions in the revised manuscript.

5. "In a few words, they should present and discuss the implications of this work for a global scientific public."

a. Technology and Policy point. First of all, the results showed the projection strong reduction in hydropower production in Northern Brazil. The main investments on expansion of hydropower in Brazil are concentrated on Amazon region which lead to environmental/social impacts and vulnerabilities due to climate projections to this regions. Gas Natural/Coal-Fired thermoelectric power plants have been primarily alternative during shortage of hydropower to secure the supplies. Also from this work, achieving power and food security combined with sustainable development Brazil policies needs to be more proactive for promoting power mitigation plans and attaining alternative clean power sources.

b. Scientific and Methodology point This paper proposed a methodology to assess the climate change impacts on the climate-water-energy nexus in Brazil and thus show the potential problems or opportunities in the expansion of hydroelectric capacity. This proposed methodology can be used by other countries that have significant presence of hydroelectric power in the power grid or be updated after the increase in hydropower plants in Brazil.

6. Specific Comments: We agree with all specific comments and we will address them on the new manuscript version.

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