



Linking climate and hydrological impact modelling at regional scale: what's going on in Brazil?

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Studies about the regional impacts of climate change on water resources have grown substantially in the last two decades worldwide; however, little is known about those impacts in the Brazilian territory. The aim of this review is to identify how the scientific community has been dealing with the integration of climate models into hydrological impact models in Brazil. We did a meta-analysis of available peer-review literature and have proposed a method for the evaluation of the degree of evidence of the impact studies. The method is used to classify each paper based on: i) the theoretical foundation of the paper; ii) the data that was used and iii) the sophistication of the modelling procedures (i.e. climate modelling, regionalization and hydrological modelling). In addition, the most relevant conclusions of the collection of documents were synthesized according to the impacts in each of the Brazilian hydrographic regions. The assessment shows that the topic has grown substantially in this decade reaching 57 documents so far but the novelty of the investigations not. The socioeconomic sectors under highest concern are drinking water supply and hydropower. The synthesis of the studies reveals that likely impacts of climate change are: i) decreasing minimum streamflow in the Amazônica hydrographic region, and ii) changes in the rainfall and discharge seasonality in the Paraná, wherein the hydropower sector is the most affected. In terms of evidence level, the application of regionalization techniques and hydrological models is reasonably consistent with the current state-of-the-art, but the use of multiple climate model outputs is ignored by most of the studies. Limitations in applying the multi-model ensemble approach were discussed through knowledge sharing activities (i.e. world café) during the 2017's Brazilian Symposium for Water Resources. The results confirm a lack of technical capacity and guidelines to access and assimilate climate data rather than computational infrastructure. At the same time, the limited amount of studies in some regions is attributed to the lack of coordinated activities among the research institutions. Sharing literature review through a participatory web-based platform is proposed here as a promising and low-cost measure to enhance coordinated activities. The evaluation of the degree of evidence of the set of studies combined with a participatory approach to interpret the results proved to be a valuable tool for guiding actions to improve the topic not only in Brazil but elsewhere.