Authors' response to the interactive comment of referee #1 on hessd-2019-475
Risks and opportunities for a Swiss hydropower company in a changing climate

We thank the anonymous reviewer for his/her general positive evaluation of our manuscript, and the helpful comments regarding the scope of the paper. Below we respond to the reviewer (*in blue*). We appreciate the comments by the reviewer, which will be used to help clarify the objectives of our manuscript.

Referee #1:

This study presents a case study focused on estimation of future changes in the streamflow and energy demand for two catchments in Switzerland. The main objective is to explore and evaluate the future inflows to two reservoirs used for hydropower production in order to support adaptation to climate change, and in particular, the negotiation of a new water concession.

The manuscript is clearly written and has a good structure, however I missed some more specific formulation of the scientific context and contribution. The link between science and engineering practice is interesting, but I wonder to what extent is the presented material in line with the scope of HESS. In its current form, the manuscript reads as a technical report and case study and does not provide clear formulations and demonstrations of the novel scientific contribution. If this is not a key requirement for publication in HESS (I'm a bit confused by reading the current scope of HESS) then I recommend to publish it, if not a substantial revision improving the formulation/ demonstration of novel scientific contribution is needed.

We submitted our manuscript to HESS because the journal aims to serve not only the hydrological science community but also water managers. Our article was submitted with the intention of addressing the third scope of HESS outlined on the journal website (https://www.hydrology-and-earth-system-sciences.net/about/aims_and_scope.html), namely "the study of interactions with human activity of all the processes, budgets, fluxes, and pathways, and the options for influencing them in a sustainable manner, particularly in relation to floods, droughts, desertification, land degradation, eutrophication, and other aspects of global change."

As stated in the introduction and throughout the manuscript, most climate change impact studies adopt a top-down approach (i.e., the end-users are hardly explicitly considered nor are the end-users involved in the modeling framework). By collaborating with a hydropower company, we were able to identify the key climate-change-related challenges of their operations. We believe that our manuscript stands out because of the bottom-up approach employed and the resulting selection of indices, which were chosen to address Groupe E's vulnerabilities (summarized in Table 2). By utilizing a bottom-up approach, our study highlights that the hydrological opportunities and risks associated with reservoir management in a changing climate depend on a range of factors beyond those covered by traditional impact studies. Given that many hydropower companies will soon enter the renegotiation process of their concessions, this work is timely, as it illustrates that these negotiations could benefit from a bottom-up climate change impact assessment. However, we agree with the referee that the novel contributions of our study could be stated more clearly. We will hence revise the text, including the abstract.

It will be very interesting to see some more quantitative assessment of the steps used in the workflow (e.g. definition, evaluation of vulnerabilities) and how do those reduce the uncertainty (e.g. how did the multiple rounds of feedbacks quantitatively impact the projections and reduce the associated risks).

We found this interesting as well and will expand upon the ways in which the feedback received by Groupe E helped to focus the design of our study. We will discuss in Section 5.2 how the multiple rounds of feedback helped to direct our attention and efforts to certain aspects of the modelling chain (e.g. calibration of HBV, selection of climate models) and how they influenced the analysis and the visualisation of the simulations (e.g. selection of streamflow indices, inclusion of thresholds and uncertainty estimates in the figures).