

## **Short Comment (Sivarajah Mylevaganam)**

### Comment:

The current version of the paper does not convince that the cited papers are sufficient and informative for the authors to draw conclusions or comments on the topic that is discussed in this paper. Moreover, from the reader's point of view, what has been discussed in this paper has already been echoed in the current literature.

### Reply:

*We agree, that the overall topic was already subject in earlier papers. However, we feel that the due to a lack of synthesis between these earlier papers, there are still quite some misunderstandings and miscommunications about the background and nature of different modelling approaches within the hydrological community. We will clarify this in the revised manuscript and add more relevant references to better support our arguments.*

### Comment:

It has been extensively argued in numerous journal papers about the pros and cons of topdown and bottom-up approach. Therefore, from the reader's point of view, for this commentary to have some merits, the authors need to go beyond what has been understood in the current literature. From the reader's point of view, it would be more useful, for example, if the authors bring the concept of middleware that lies in between the said approaches of modeling (i.e., top-down and bottom-up).

### Reply:

*We agree and that is exactly the intention of this manuscript: different model approaches need to converge for further progress in the discipline. We will make this clearer in the revised manuscript.*

### Comment:

In the current version of the paper, the authors scrutinize common modelling critiques (C1-C3). Are these critiques developed by the authors? Are these critiques developed based on some published survey? What motivated the authors to consider these critiques as the "common" modelling critiques?

### Reply:

*These critiques are points that often came up in the authors' discussions with modellers from other research groups during international conferences, workshops and joint projects.*

Comment:

In the current version of the paper, the authors scrutinize common modelling critiques on top-down models (C1-C3) and discuss the extent to which they are justified. From the reader's point of view, the title of the paper does not fit the content of the paper.

Reply:

We fully agree and we will re-structure and re-phrase the relevant sections of the manuscript.

Comment:

Referring to line number 22 on page number one, the authors state that the models frequently fail to reproduce the hydrological response in periods they have not been calibrated for, thereby providing unreliable predictions. From the reader's point of view, this statement needs to be cited.

Reply:

*Agreed, we will provide suitable references.*

Comment:

In the current version of the paper, the authors discuss about the spatial complexity, process complexity, and spatial scale. However, referring to line number 22 on page number one, from the reader's point of view, it would be more useful if the authors discuss about the influences of temporal scale and its complexity on the said approaches of modeling (i.e., top-down and bottom-up). Is it scientifically justifiable that the processes that are modeled at a particular temporal scale do not change when the temporal scale changes? In the current literature and the modeling practices, the processes that are modeled are the same regardless of the temporal scale of the simulation.

Reply:

*Interesting point and we will consider a discussion of this in the revised manuscript.*

Comment:

Referring to line number ten on page number one, a better understanding bears the potential of identifying the complementary value of the two philosophies for improving "our" models. Are these models developed by the authors? Is this commentary about the models developed by the authors?

Reply:

*The term "our" throughout the manuscript refers to the hydrological modelling community and the models developed by the community.*

Comment:

From the reader's point of view, some of the paragraphs are repetitive (e.g., the paragraphs about the activation and deactivation of processes).

Reply:

*We will analyse and re-phrase where appropriate.*