Zhi LI
Student NO. 4765729

Reviews of Hydrologic models' philosophy

1. This article explains the distinctions between bottom-up and top-down models in a way but seems to lack some connections. I hope to see they are actually complementary and combined in a specific situation and from that, we could observe its limitations and constrains.

2. "models do a good curve-fitting job, but do not represent the dominant process of the system in a meaningful way", which indicates the calibrated model may reproduce ridiculous parameters so that presents the contradictory hydrologic process inside the domain. In my perspective, this model assimilation process may cause "errors" as it depends on automatic routing but what if we impose some constrains on the model variables? It may help us to look for some more reasonable combinations of parameters.

3. Top-down models apply physics of mass conservation and energy conservation in a macroscale way. If we split the whole domain into pieces based on all kinds of methods of distributed models and in such a small domain, energy and mass are conserved, then can this approach solve the issues for top-up models?

4. I think one important point that is ignored in this article is about how we process collected data in a right way. Data are significant for not only the top-down model but still also for the bottom-up model even though it is highly physics based. In reality, most of the recorded data are inconsistent, noisy and incomplete, to some extent, posing the eventual result not as well as expected. Thus, it is a big deal to address.

5. It complains we could simplify our model by dropping some unnecessary parameters inside the domain but we still have no clue which parameter should be ignored. In my opinion, we can consider this in such aspects below:
   - Connectivity. We could identify each parameters' connectivity in the whole modeled area by looking through its contribution to our results. For instance, generally, parameters in the downstream could have less contribution to output.
   - Sensitivity. Those parameters which impact influx between sub-domains or output may be unnecessary in a way and can be ignored.
   - Importance. Based on our concentration, we can simply drop out parameters with less focus or take them as homogeneous values inside the domain.

6. "all hydrological models applied at scales beyond the plot scale require some degree of calibration including bottom-up models". Is this calibration the same as top-down model calibration? If so, how could make sure that the correctly presented parameters are coerced to become misrepresented parameters by computation?