

Hydrol. Earth Syst. Sci. Discuss., author comment AC2
<https://doi.org/10.5194/hess-2021-170-AC2>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Reply on CC4

John Ewen and Greg Martin O'Donnell

Author comment on "If a Rainfall-Runoff Model was a Hydrologist" by John Ewen and Greg Martin O'Donnell, Hydrol. Earth Syst. Sci. Discuss.,
<https://doi.org/10.5194/hess-2021-170-AC2>, 2021

Grey

This is a response to CC3 and CC4.

CC3 says: "*You have chosen to focus on one (small) aspect of my comment and ignore the rest.*" In fact, we focussed on a claim that our model has absolutely no lasting value whatsoever to anyone, and a claim to the effect that the subject of the title of the paper is a redundant conception. These claims are central to two of the three general concerns you highlighted in your review. The claims are not well founded (they lack insight) and some readers may read the review but not the paper. We therefore responded to the claims as soon as we could.

A sense of proportion and fairness is needed in discussing the third highlighted concern (philosophy). In CC4, in the name of philosophy, you try and shout down (cancel) hydrologists who use intuition creatively in hydrology. Cannot intuition, and the insight it brings, not simply be appreciated and be adapted for use for the general good. It never crossed our minds that a reader or reviewer would persist in the notion that we are somehow trying to reinvent technical writing or are engaged with what you describe as "*changing how we write scientific papers*". Neither did it cross our minds that a reader or reviewer would persist in assuming we propose the use of everyday English other than in scientific exploration, and then only when it is useful and practical (our background is physically-based, distributed RR modelling, where the documentation runs to hundreds of pages of text, equations and diagrams).

The paper gives a science-based solution to a real-world problem: benchmark links between hydrologic knowledge and performance are needed as a basis for measurements related to engineering decisions. There is irony in that a serious attempt to be clear about what is assumed known in reaching the solution is attacked on philosophical grounds, especially given L128-131. Also, any discussion of the solution, or how it was arrived at, must take into account that in L180-181 we explicitly allow for permanent review.

We have been thinking about what might be covered if a discussion section is to be added to the paper. The predictions are for the numbers in runoff records, so in the context of the paper the records are reality. Say there are three regions in a space: physical reality (i.e. the river catchments), hydrologic knowledge and performance. The paper is about a single mapping from hydrologic knowledge to performance. Other mappings are not

discussed, such as mappings to or from physical reality, or back from performance. One-to-many, many-to-one and many-to-many mappings are not discussed. To the extent that it can be helpful, such mappings could be described in a discussion section in terms of common philosophical concepts which interest RR modellers.

The 2nd paragraph in CC4 is grossly unfair. It seems to be a reaction to this text from AC1: "*One of the points made in the blind validation work is that models and modellers must be seen as a package (Ewen and Parkin, 1996). Our experience is that hydrologists running an RR model sometimes forget the nature of the model. Sometimes it is treated as a statistical black box. The worst case is when the model is treated as if it is reality, and it is implicitly assumed that there are no constraints on what can be concluded from the resulting simulations.*" The term "black box" seems to have been lifted from this text and its meaning adjusted to fit your case. The reality is that RR models are often run as a general resource, well outside the control of model developers (you seemed to have assumed that the text is about model developers running their own models). Some models run as a general resource have considerable complexity, and this can lead to belief in simulated detail (including spatial variations in response) or in all the available energy being spent on the sheer effort of parameter calibration against one or a few statistics (i.e. treating the model as if it is a black box).

John and Greg