

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
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Comment on hess-2021-597

Anonymous Referee #1

Referee comment on "Use of expert elicitation to assign weights to climate and hydrological models in climate impact studies" by Eva Sebok et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-597-RC1>, 2022

Unfortunately, despite an admirable effort by the authors to produce a robust paper, it is a fatally flawed approach to assess impacts.

Here are several papers that discuss this issue.

Burgess et al: 2020: IPCC baseline scenarios have over-projected CO2 emissions and economic growth Environmental Research Letters 16 (1), 014016

Pielke Jr R. and J Ritchie: 2021: Distorting the view of our climate future: The misuse and abuse of climate pathways and scenarios R Pielke Jr, J Ritchie Energy Research & Social Science 72, 101890

Pielke Jr R. and J Ritchie: 2021: How Climate Scenarios Lost Touch With Reality R Pielke Jr., J Ritchie Issues in Science and Technology, 74-83

Pielke Jr et al 2021::Most plausible 2005-2040 emissions scenarios project less than 2.5 degrees C of warming by 2100 R Pielke Jr, MG Burgess, J Ritchie SocArXiv

The more robust way to assess risk is the contextual approach proposed by

Füssel, H.-M. (2007), Vulnerability: A generally applicable conceptual framework for climate change research, Global Environ. Change, 17, 155–167.

O'Brien, K. L., S. Eriksen, L. Nygaard, and A. Schjolden (2007), Why different interpretations of vulnerability matter in climate change discourses, *Clim. Policy*, 7(1), 73–88.

Applications of this approach can be found in

Hossain, F., J. Arnold, E. Beighley, C. Brown, S. Burian, J. Chen, S. Madadgar, A. Mitra, D. Niyogi, R.A. Pielke Sr., V. Tidwell, and D. Wegner, 2015: Local-to-regional landscape drivers of extreme weather and climate: Implications for water infrastructure resilience. *J. Hydrol. Eng.*, 10.1061/(ASCE)HE.1943-5584.0001210 , 02515002.

Pielke, Sr. R.A., J. Adegoke, F. Hossain, and D. Niyogi, 2021: Environmental and social risks to biodiversity and ecosystem health – A bottom-up, resource-focused assessment framework. *Earth*, 2, 440–456. <https://doi.org/10.3390/earth2030026>

These uses of scenarios have become a cottage industry, but are poor science in my view.

If the authors still disagree, they need to quantitatively show in hindcast runs that the models can skillfully predict changes in regional climate statistics that matter to the hydrological impacts they are assessing. Reanalyses (of changes in regional climate statistics) are the baseline to compare with the models not between models.

This statement from their paper summarizes the inadequacy of the study

"The experiment resulted in a group consensus among the climate modellers that all models should have an equal probability (similar weight) as it was not possible to discriminate between single climate models, while also maintaining the importance of using as many climate models as possible in order to cover the full uncertainty space in climate model projection"

The uncertainty of the model results does NOT bracket the real world uncertainty. These types of studies are misleading policymakers.

I checked "reconsider after major revisions", rather than recommending "rejection" since the authors' methodology of accepting the climate model results as having demonstrated skill at multidecadal regional climate change statistics is applied throughout the impacts

communities. The authors need to objectively respond to the view that the approach they are using is not scientific robust.