

Interactive comment on “Wetropolis extreme rainfall and flood demonstrator: from mathematical design to outreach and research” by Onno Bokhove et al.

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The paper describes the mathematical design of Wetropolis, a tactile, tabletop demonstrator of flooding and probabilistic nature of the rainfall which causes it. The activity is certainly novel and innovative, and I consider the use of the Galton boards to determine rainfall events inventive with there being a lot of scope for future work into how effective this is for communication of flood likelihoods.

Unfortunately, this manuscript does not do the developed activity justice as it merely describes the mathematical model used to design and parameterise the physical model, and some description of the outreach it has been used for. In its present form it lacks

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a clear research question. It is not that I don't think that either of these elements are publishable, but both need significant development to get to that stage and most likely as two separate manuscripts.

For the mathematical model, more needs to be said about how it compared to the physical model once built – how well did the maths compare to observations from Wetropolis? How does the mathematical model compare to other numerical codes of hydraulics? More guidance needs to be provided by the authors into how it can be used to advance hydrological and hydraulic modelling. As it reads at the moment I cannot see what the interest in this mathematical model would be or how anyone would utilise it.

For the outreach, there needs to be much more detail into the design choices – why was a tabletop demonstration chosen, especially when the mathematical model would lend itself to a cheaper and easier to produce numerical demonstration? What were the inspirations for the design? The design of the activity needs to be positioned within a theoretical framework for public engagement, including a relevant review of the literature.

I have no doubt that Wetropolis is a successful outreach activity, and that it is effective at achieving its aims, however, the manuscript lacks evidence for this beyond a list of events attended and some anecdotal comments. For example, on Page 21, Lines 27-29 the authors state “In particular, Wetropolis aids in raising awareness of the probabilistic character and randomness of rainfall and flooding events, also in connection with the difficulties in predicting some of these extreme events.” without demonstrating how they have come to this conclusion - for example, was this through interviews or questionnaires with those partaking in the activity? The sources cited to support a further point on Line 30 also do not provide this evidence and are news articles describing that the events happened.

My recommendation for a redevelopment manuscript would be –  Clearly define the

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messages they wish to be communicated and criteria they'll use to assess if they have communicated these effectively. Describe, with review of literature, why the design of Wetropolis should help them achieve this. Formal evaluation of Wetropolis at events, workshops etc against the criteria established. Discussion of how results varied between different types of events, different audiences, and different methods of communication (eg, was there an accompanying lecture)

I'm sorry I cannot provide a more positive review. I do hope the authors will revisit this and return with revised manuscripts as Wetropolis is an impressive creation and deserves to be shared widely.

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