

Reviewer 3

The manuscript describes an interesting outreach prototype that allows to better understand the rainfall runoff dynamic. The topic is appealing for the community and I am glad to suggest its publication. The main issue that I would like to share with the authors concerns the organization of the manuscript.

Introduction

1) Page 2 – lines 15-32 and page 3 lines 1-20, although interesting are off topic.

We disagree. The first question pertains to the background on rainfall and what the public wants to know; since (random extreme) rainfall is a key component of Wetropolis, it is relevant and also is part of our motivation. The second question is relevant to understand why we made a discrete Galton board with a “discrete” tail of probability 1/16. To emphasize this aspect, we have added “... is relevant because we will create a “discrete” distribution with a “rare” tail.” The third question is also relevant because it features in our design, so we have added: “We will use this direct response of floods driven by one or two days of heavy rainfall in our design”. Consequently, we have now made clear how discussing the statistics of extreme events has fed into the factual Wetropolis design. Note also that reviewer 2 wanted to know what had inspired us so we now have clarified matters accordingly.

2) Page 4. Too many technical details about Wetropolis for an Introduction Section. I would include here eventually similar outreach prototypes and the aim of Wetropolis.

- We prefer this very simple exposition on the statistics involved, which involves back-on-the-envelope calculations with little technical difficulty, to appear here in the introduction already.

What kind of experiments can be done?

- Wetropolis is not a scientific experiment but a flood demonstrator. What variations can be undertaken is discussed further in section 5.1 on games. More simply, people like to trick the Galton boards with their fingers or a pen, thus triggering the extreme events they wish to take place. We further extended the discussion in 5.1 with remarks on modeling droughts and modeling climate change with suitable changes to the statistics. This can be done within the same set-up by altering the programs driving the Arduino boards.

Which phenomena author would like to show.

- We explain now much more clearly that there is one challenge that was posed by flood professionals and solved by us: make a 3D demonstrator that explains in a visual way what a return period is.

3) Other Sections. The analytical part of the paper seems in contradiction with the outreach aim.

Why all these formulations are included?

- The Wetropolis construction is based on a mathematical and numerical design model. So a) without the numerical (and hence also mathematical) model there would not have been a physical Wetropolis model, and b) the design description allows other people to redesign Wetropolis and likewise adaptations to the numerical modelling may aid in their design modification. So the modelling is described in details for (re)designers. We now clearly define this as one of our goals.

This should be better explained before their description otherwise could be included in the appendix. Indeed, it is not fully clear if these formulations are part of the outreach aim of they are only useful for the Wetropolis design.

- The mathematical and numerical formulations have been crucial for the Wetropolis design, are de facto a design principle and they are useful in redesigns, for example by readers who wish to adapt Wetropolis to their local catchment situation, which two aspects we now have greatly emphasized. We have used this design principle, to use a lean design model to guide the experimental design, in other (outreach) fluid experiments we have made in the past, such as the bore-soliton-splash, the Hele-Shaw beach experiment and the coastal wave tank. We have highlighted to the coastal wavetank. Otherwise said, one of our theoretical foundations for outreach fluid demonstrators is to start with a lean and mathematical design model, let it guide the factual creation of the demonstrators and do not get side-tracked by detailed modelling questions because in the actual construction changes are naturally made to optimise the physical design.