

Review of Sea level rise in Los Santos and Los Angeles: a comparative flood analysis using Grand Theft Auto V

Article by Paul Nörenberg and Hugues Lantuit. Review by Rolf Hut

The authors study if similar conclusions can be drawn when exposing the fictional city of Los Santos from the GTA V game to climate change induced sea level rise, as compared to the actual city of Los Angeles, on which Los Santos was based. They furthermore want to know if using Los Santos (and GTA V by extension) instead of Los Angeles can be successfully used in science communication and education. I really liked the idea of this: this is an original approach and a topic that fits the journal of Geoscientific Communication. I do, however, have a few key points on the methodology and conclusions that I'd like the authors to consider, respond to and potentially use to improve the manuscript.

Key points

AR5 vs AR6

The authors use AR5 and not the more recent AR6 as input for their flood modelling. They justify this by arguing that no studies exist that translate global sea level rise from AR6 specifically for the Los Angeles area and which areas would be flooded. The data on sea level rise per location from AR6 is available here: https://sealevel.nasa.gov/ipcc-ar6-sea-level-projection-tool?psmsl_id=245&data_layer=scenario (for Los Angeles). I would challenge the authors to see if the work of Grifman 2013 and/or Moffat and Nichol 2018 can easily be reproduced using AR6 sea level rise data? Conceptually 'all' is needed is a good digital elevation model of Los Angeles to do this analyses, which I think they are already using (judging from figure 7)? The authors already mention this limitation to their work. I would like to challenge them to instead of accepting it, to overcome it.

Static flooding

The authors do mention that a limitation to their work is that they look at height in the digital elevation model and compare that to sea level rise, without taking the hydro-dynamics of flooding into account. This is defensible in a paper that explores the use of Los Santos as equivalent to Los Angeles. Methodologically, this basically turns the exercise of "does Los

Santos matches Los Angeles” into one where the height map of Los Santos is compared to that of Los Angeles. Given how LS is modelled after LA, it is not surprising that they match quite well. (Still good to know, so good research to be done)

However, the flood hazard and climate change community have moved on to study the impact of flooding under climate change using dynamic models (including coupling river models to coastal models). It is unfair to ask the authors to run a study like this for LS. But: for the modelling community it would be a great asset if the digital elevation model of LS was available openly as a testbed for their studies and to build on the work of the authors.

I therefore would ask the authors to, next to this paper, publish the output of their workflow directly as supplementary material (of file size permits) or as a separate data publication (on Zenodo?) with a separate DOI that is linked to this work.

Conclusions on science communication and educational potential

Here I refer to reviewer #1, who beat me to it in providing his review. I share the same concerns and it would be inefficient to repeat them here, for the authors to have to respond to both separately. I do want to stress that I think this is an important point that the authors do need to address.

Concluding remarks

Using a popular game such as GTA V is not only an interesting way to do education or science communication, the study done here and up for publication in GC itself is most likely worthy of media-attention, and rightly so: it is an innovative idea using a very well known game. This stresses however the need to be methodologically very sharp. I strongly believe that this can become a very broadly read paper and hope the authors find the above observations and suggestions useful in updating the manuscript.