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Interactive comment on "Costs of sea dikes – regressions and uncertainty estimates" *by* Stephan Lenk et al.

Anonymous Referee #2

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The authors apply an empirical approach to derive a functional form for the costs of construction of coastal dikes as a function of height. With this purpose, they set up several regression models with costs as predictand and several. They estimate the parameters of these models using cost data from the Netherlands and Canada. The main conclusion is that, somewhat surprisingly, the costs can be mainly described by a liner function of dike height, with no (or very small) fixed costs.

My general evaluation of the manuscript is positive, although there are some issues that the authors may want to address in a revised version.

1. One general point is that the English needs some editing. This does not deter from understanding the current version, but the text will benefit from copy-editing before eventual publication.

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2. One main concern is that the authors quite freely extrapolate the results obtained from these two regions to offer recommendations 'worldwide'. I think this can be an oversimplification, especially the conclusion that the fixed costs seem to be so low. Will this conclusion also apply to other regions with a weaker tradition of adaptation to sea-level rise or to areas that so far have not been threatened by sea level rise so far? I can imagine that in those regions the fixed costs can be substantial.

Some particular points

3. 'Sea-level rise represents the least uncertain consequence of climate change and there is considerable interest in comparing coastal flood damage with adaptation costs

It is not clear what the authors mean with this sentence. The range of estimations of future sea-level rise is very broad and i depends on physical mechanism, like land-ice dynamics, that is not well understand and that it is actually not implemented in current climate models. Perhaps the authors mean that it is certain that global sea-level will rise, but the magnitude and its regional distribution is very uncertain, much more than temperature. There may be areas where sea-level will fall or rise, for instance in the Northern Hemisphere at high latitudes, depending on the rate of melting of Greenland and Antarctica

4. 'The latter investigated costs for coastal protection of low-lying delta areas using project-oriented case studies for the Netherlands, New Orleans, and Vietnam.'

'The latter' is here too unspecific , as there is a sentence in between. It is not clear whom the yuathors are referring to.

5. 'They also analysed the relationship between dike height, dike cross-section, and costs of raising dikes at a very coarse level and depending on the site'

analyzed at a very coarse level and depending on the site the relationship... As it stands now the sentence could mean that the dikes were built at very coarse level

6. 'Second, what is the range of uncertainty that needs to be considered? '

I think the authors mean what are the sources of uncertainty that need to be considered

7. 'The report provides high-level long-term estimates in the preparation phase and we do not have any information if any of the planned dike has actually been constructed to date'

what does 'high-level' mean here

8. ' provides information about the expected flood levels in 2100'

is this the expected relative mean sea-level rise or extreme sea-level rise events ? if the latter,. which percentile?

9. 'dike constructions of 1 m to 5 m height or raise'

of raise ? the sentence is unclear

10. 'In Fig. 1(a) it can be seen for the Canadian data, that the 4 models all have similar shapes and their deviations are small' delete comma after data

11.'Fig. 2. It can be seen, that the uncertainty encloses a rather large range which is increasing (due to the log-normal definition)'

delete comma after seen

12. 'The cost estimate for raising a dike in Canada by one metre encompass roughly 6,000 EUR '

encompass is not the right word here, I think

13. 'Nevertheless, few values are also located outside the 95 % ranges suggesting, that the log-normal distribution might only be a first approximation.'

delete comma after suggesting. The word 'also' is irritating here. Do the authors mean 'In addition, few values are...

14. 'Moreover, it can be seen that the difference between the land uses is smaller than

between the countries. ’

This is a somewhat sloppy wording. The authors mean that the influence of land use is smaller than the influence of country

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