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Interactive comment on "Economic assessment of measures aimed at reducing flood damage to buildings using computer modelling and expert judgement" *by* Claire Richert et al.

Claire Richert et al.

claire.richert@irstea.fr

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Dear Referee,

Thank you for your comments.

Regarding your general concern about the novelty of our article, we agree that we should emphasize it better in the abstract and in the introduction.

We think that the novelty of our article lies both in our research question and in our results.

We explain in the following why we think that our research question is original.

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The purpose of the other articles that deal with the assessment of precautionary measures is mainly to examine their mean efficacy (or cost-effiency) in specific contexts. By contrast, we aim to present in-depth analyses of how these efficacy and cost-efficiency vary depending on the buildings characteristics and exposure to floods. Such analyses are useful in order to better target the dwellings for which precautionary measures could be advantageous.

We also think that we provide new and useful results. Mainly, we present a systematic methodology to identify the conditions (in terms of exposure to riverine floods) in which the measures cannot be cost-efficient, no matter the building materials. We apply this methodology to identify these conditions for the whole France. This result can be used by decision-makers to recommend precautionary measures only to inhabitants that live in dwellings for which precautionary measures could be advantageous.

Your second comment was: “Point out even better what is new and innovative compared to earlier studies. This should become clear from the abstract and the introduction and maybe even the title.”

Thank you for this comment.

We propose to change the title to: “Economic assessment of precautionary measures against floods: insights from a non contextual approach”

In the abstract, we propose to replace the 2 following sentences “In particular, a better understanding of the influence of buildings characteristics and floods parameters on these variables would help identify the measures that are relevant to implement in specific contexts. We examined this topic for three groups of measures taken on existing dwellings: [...]” by: “In particular, the influence of buildings and floods characteristics on these variables has not been thoroughly studied. A better understanding of this topic would help identify the measures that are relevant to implement in specific contexts. To address this gap, we examined the effect of buildings and floods characteristics on the cost, efficacy, and cost-efficiency of three groups of measures taken on existing

dwellings: [. . .].”

In the introduction, we propose to modify the paragraph on page 3, lines 12-16 by: “In brief, the existing literature focuses on assessing the efficacy or cost-efficiency of precautionary measures, rather than on explaining their variability. The aim of our study was to address this gap. We combined data based on expert judgement and computer modelling to analyse three types of measures (elevation, dry-proofing, and components adaptations) for a wide range of flood intensities and dwellings characteristics, including the material used for their components. More specifically, we assessed ranges of cost and efficacy of the measures and examined the influence of buildings and floods characteristics on these variables. For each type of measures, we also found a range of exposure level for which it is unlikely that the measure could be cost-efficient, independently of the buildings characteristics.”

Your third comment was: “I don’t like the word “computer modelling” in the title. Almost everything is computer modelling nowadays. Can you find another word to describe what makes this article new compared to the earlier studies”

We propose the following title: “Economic assessment of precautionary measures against floods: insights from a non contextual approach”

Your fourth comment was: “You look at a maximum duration of 144 hours. Some floods can last many months, could you discuss this choice and give an estimate of how the conclusions would differ for longer flood durations.”

Thank you for this comment. We propose to discuss this point in Section “5.4 Limits”:

“We only studied the efficacy and cost-efficiency of the strategies for dwellings that are exposed to floods that do not last more than 144 hours because the experts interviewed to develop the elementary damage functions did not have information about the consequences of longer floods. The efficacy of dry-proofing for such floods is null because it is recommended to let the water enter the building after 48 hours. As for the

elevation strategy, its efficacy in case of floods that last more than 144 hours depends on the propensity of such floods to generate foundations failure. If the foundations fail, the fact that the building is elevated does not reduce the damage. The efficacy of the component adaptations strategy for floods longer than 144 hours depends on the vulnerability of the recommended components when they are in contact with water for more than 144 hours."

Minor comments:

We agree with your three first minor comments and will take them into account in the article.

Your fourth minor comment was: "Page 6, from line 25: Not entirely sure what you mean by perimeter."

We mean: the length of the boundary of the building. Maybe "circumference" is more appropriate?

We also agree with your fifth comment.

Your sixth comment was: "Page 9: Can you provide an intuitive explanation of maximum cost-efficiency?"

The maximum cost-efficiency is a supremum of the cost-efficiency. In other words, for a given strategy and a given type of building (single storey house, double storey house, or apartment), the cost-efficiency of the strategy is always lower than the maximum cost-efficiency, regardless of the building materials or the relationship between the flood intensity and frequency.

Your seventh comment was: "Page 13, line 18: "flood barriers must be completed by other measures", I think youmean complemented instead of completed."

Thank you for pointing this out. You are right.

We did not understand your last comment: "Throughout the paper: Can you provide

price levels whenever a monetary value is mentioned." Could you provide an example?

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