

Interactive comment on “Estimation of the effects of climate change on flood-triggered economic losses in Japan” by S. Tezuka et al.

Anonymous Referee #2

Received and published: 26 May 2013

The paper deals with an interesting topic that is studied by many other researchers as well. The paper is well written, but the approaches are difficult to follow and appear to have some flaws or are at least not documented sufficiently.

Major issues: P 1623, L20: The equation is not properly explained and the indices cannot be right. Throughout the paper it is not clear when monthly and annual data are used.

P 1624, L2: It is not properly explained how to derive the denominator. If it is obtained simply by interpolating between each pixel in the GCM simulation it is a highly unusual approach that is questionable, because the bias of the GCM is not taken into account. From the equation it is not even clear if the authors consider the climate change signal

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at all or just use the raw input from the GCM without accounting for bias at all. If they do not account for bias it explains the unusual results reported in Figure 1.

P 1624, L 14: The formulation of the GEV is mixed together with the estimation principles, making the entire section difficult to read. It is never mentioned which data are used as input to the GEV, perhaps annual maxima? When reformulating the section, please also correct the errors in Equation 6.

P 1626, L 7: Again, it is unclear whether annual or monthly data are being used.

P 1626, L 8-10: It is very unclear what has been done. Please clarify.

P 1626, L 13: If 20 ° C are used, then please provide more details. That is pretty far from the melting point of water.

P 1626, L 18: The reference to Ushiyama and Takara makes it unclear what is part of the reported study and what has been made by others.

P 1627, L 5-17: It is not clear how this section is related to the previous section. Exactly what data (monthly/daily/annual) are being used and for what purpose? Please clarify.

P 1629, L 8-9: The 2D non-uniform equations on the previous side is only of interest if they are used. Please state the exact equations actually used in the study. P 1629, L 4-6: Values and assumptions are not justified. Please derive and/or explain e.g. additive mass coefficient.

P 1629, L 15: Testing an approach on part of a city does not justify extrapolation to an entire country including mountaneous areas etc. There should be some sort of calibration or justification of the approach based on present data and climate.

P 1630, L 25: Since all data is at hand it would be nice to see a seasonally adjusted cost function.

P 1632, L2: Please justify “the same way”. Equation 15 and 16 does seem to be different.

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P 1633, L 24: Please be more specific in this equation. There must be some form of unit cost in USD.

P 1634, L6: What does Figure 3 show? Monthly or annual changes? How is the result linked to the theory in section 2?

P 1634, L 15: By probabilistic analysis you mean section 2.2 and 2.3?

P 1634, L 17: The resolution is not very good, but Figure 4 appear to show larger changes than what is implied by Figure 3? Please clarify.

P 1635, L 3-5: That is a very bold statement, given the abundant literature with different results. The result should be discussed in that context.

P 1635, L 13: Please calculate the expected annual costs as explained in e.g. Chow et al (1988). Figure 5 indicate that the contribution of the 5 year return period event to the overall expected annual cost is much larger than the 100 year return period, which the authors should include in their discussion.

P 1635, L 25-30: Please clarify. Intuitively it seems wrong that Figure 3 shows changes of 2-14% while Figure 6 shows changes on 10-125%.

P 1637: I am very uncertain that the methodology is sound and hence I doubt that the conclusions are justified.

Minor points:

P1621, L 18: The same point is mentioned several times, quoting different authors.

P 1621, L 23: please define the term in-house flood control policies

P 1622, L 11: Please find a more authoritative reference.

P 1629, L 2: lambda has been used for another purpose in the paper already.

P 1632, L 11: Please define inundation influence working force(employee).

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 1619, 2013.

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