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Interactive comment on "Developing fragility functions for aquaculture rafts and eelgrass in the case of the 2011 Great East Japan tsunami" *by* Anawat Suppasri et al.

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We highly appreciate the time that the reviewer spent in reviewing our manuscript. Their comments and suggestions are valuable.

Response to major comments Thank you very much for pointing out this important issue. We totally agreed that the damage definition should be more clearly specified. In order to this, we have added more explanations mainly in section 3.1 as well as other related sections about the damage level defined by the Japan Fisheries Agency (JF) and the damage used in our study. The classification by JF has four levels (complete, major, moderate and minor damages). This classification is used for assessing the

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damage as well as the recovery process. Our study used satellite images before and after the tsunami which only allowed us to investigate the complete damage (wash away) from other damages or undamaged. According to your question, we have now clearly mentioned that the developed fragility curves are for the complete damage level in both the explanations and figures 12 and 15. Please see more detail below on our answers and responses.

1. To provide a comprehensive classification of possible damages on the aquaculture rafts (damage classes definition): There are four damage levels defined by JF, namely, 1) complete damage (wash away), 2) major damage (70-100% damage), 3) moderate damage (30-70% damage) and 4) minor damage (less than 30% damage). 2. To associate a specific damage class to each offshore marine system: As the pioneer study, we could only used the satellite images before and after the tsunami. Based on the quality of the image, we could only be classified whether the rafts were washed away (complete damage) or not. We are now working on collecting the actual data from the local fishery agencies but there are some difficulties as the damage data is related to personal information. We may be able to get with several document works or might not possible. Therefore, using the satellite images for the damage classification was only the best method we could you for now. 3. To develop fragility function for each damage class/level: As mentioned above, this study could only able to develop the fragility functions for the complete damage level. In our future study, fragility functions for other damage levels will be certainly considered using the actual damage data if we can have access to such data.

Response to minor comments Fig. 3: We understood the point mentioned by the reviewer. However, our tsunami simulation was done using the nesting grid systems and it is important to show readers the coverage area of our simulation from the tsunami source. Fig. 4: We have changed the wordings from "calculated" and "observed" to more understandable "simulated" and "measured" as your suggestion. Fig. 5: We have modified the color bar according to your suggestion. Now color ranges of tsunami and

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topography are totally different.

All responses, corrections and improvements are shown in red in the revised manuscript.

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