**Response to editor and reviewer**

**Editor: Heidi Kreibich**

- **I advise you to take the chance to check your manuscript again and to make sure, that all equations, expressions and definitions are correct and to further improve as much as possible.**

Answer:

The manuscript has been checked including all of the equations, expressions and definitions.

**Anonymous Referee #1**

This research paper has developed an efficient risk assessment system for the sea ice disasters on fixed jacket platforms. The investigation has great practical relevance and could be potentially used in safety analysis or estimation for structures facing sea ice disasters. The paper is generally well written but several points can be further improved:

- **1) Page 2 line 24: There is an additional ",” after 2014.**

Answer:

The additional ".” was deleted.

- **2) Figure 1 title: There is an additional "(”.**

Answer:

The additional " （” was deleted.

- **3) Figure 2: One should change the order of sub-figure (e) and (d).**

Answer:

the order of sub-figure (e) and (d) was changed.

- **4) Page 5 line 6: The reference "Zhang et al., 2007” should be "Zhang and Li, 2007”?**

Answer:

It was Revised.

- **5) Page 5 line 20: Note the index "H” in "the hazard index (H)” should be italic.**

Answer:

It was Revised.

**6) Page 6: From line 1 to 12, the positions of Equations 1-3 are not in the correct place in the text. One must put the equation directly after the text where the equation is mentioned.**

Answer:

It was reviesed.

- **7) Page 6, line 16-19: "Sea ice disasters have three major risk sources … and four structural risk modes …” The author should give the reference for this.**

Answer:

The reference was given

- **8) In general, the equations are not in the same format. Note the blank spaces in front of the equations are different.**

Answer:

It was reviesed. There is no spaces in front of the equations now.

- **9) In general, many index/sign used in equations are repeated. It is suggested**

**one use different indexes/signs for different parameters or at least give them different subscripts.**

Answer:

The equations were revised. Mainly for the index "H":

(1) hazard index ($H$)

(2) ice thickness ($t$)

(3) height of structure ($H_{str}$)

- **10) Page 7, line 6-7: Note the subscript of "F_H". Should "H" be italic or not?**

Answer:

It should be italic.

- **11) Page 7, line 17: "After floe is applied on a structure and then broken, if broken ice is not removed in time due to structural blockage, ice accumulates". "floe" is a typo? Also one must rephrase the whole sentence.**

Answer:

Floe means big floating ice sheet.

- **12) Table 2: It should be "MPa".**

Answer:

It was reviesed.

- **13) Page 11, line 7: "... are respectively set to be 1 and 2" why does the author use these parameter values? Any reference?**

Answer:

Ice force on single leg platform equals to one time of ice force on one leg, that was "1"; Ice force on four-leg (2 times 2) equals to two times of ice force on one leg when the ice coming direction was the same with the construction of platform (with the lowest total ice action), that was "2".

Reference was added "Liu, Y.: Research on Dynamic Analysis and Structural Lectotype of Ice-resistant Offshore Platforms, Dalian University of Technoloty. Doctoral thesis, 2007."

- **14) Page 11, line 24: "Ka" is not in the right format. Also one must provide reference why 0.5 is selected for main platforms and 1.0 is selected for auxiliary platforms.**

Answer:

The format of "$K_a$" of reviesed.

the structural function also directly affects the risk level. For example, there are many devices on oil production platforms. The design of manned platforms should pay attention to personnel comfort and their risk is relatively high. Unmanned platforms have a low risk. Kb is the structural function coefficient and its values for manned central platforms, unmanned central platforms, and auxiliary function platforms such as the bollard are respectively set to be 1.5, 1.2, and 1.0.

The ice-induced vibration value M3 is expressed as:$M3=V1*V2*V3*V4^{0.5}$.

By compare contribution of four parameters, which are overturning index V1, dynamic indexV2, ice-induced vibration indexV3, and function indexV4= Kb), The value of V4 made smaller contribution to risk results, so the 0.5 exponent of proposed. This conclusion has been validated by experts, and the conclusion was published in postdoctoral research report" Xu, N. Research on Critical Issues of Sea-ice Disaster Risk Assessment and Prevention

Strategy. 2014".

- **15) Page 12, line 4: "V1" correct in format? Line 7 the reference should be "Yue et al., 2007b". Line 8: Acceleration "A" should be italic.**

Answer:

All are revised

- **16) Page 12, line 22: "… such as the bollard are respectively set to be 1.5, 1.2, and 1.0" why? Any reference?**

Answer:

the structural function also directly affects the risk level. For example, there are many devices on oil production platforms. The design of manned platforms should pay attention to personnel comfort and their risk is relatively high. Unmanned platforms have a low risk. Kb is the structural function coefficient and its values for manned central platforms, unmanned central platforms, and auxiliary function platforms such as the bollard are respectively set to be 1.5, 1.2, and 1.0.

This conclusion has been validated by experts, and the conclusion was published in postdoctoral research report" Xu, N. Research on Critical Issues of Sea-ice Disaster Risk Assessment and Prevention Strategy. 2014".

- **17) Page 12, line 25: "M3" is not in the right format.**

Answer:

It was reviese

- **18) Page 19, line 17: what are "level ice" and "rafted ice" and the difference between their parameters? Can one give more detailed explanation?**

Answer:

The following sentence was added in the manuscript "such as the range of ice thickness, the value of ice strength, and the their weight for the risk value under different risk modes."

- **19) Page 20, line 15: The author must keep the reference format consistent. For example, for the page number the sign "1-70" is in different formats.**

Answer:

It was revised.