Dear Anonymous Referee #2:

Thank you very much for your kind time on my submission!

I really appreciate your valuable and poignant comments on helping improving the present manuscript, and we have the following addresses to your comments. We hope our responses and modifications are satisfying. Modifications in the resubmission are given with a yellow-color background here in our addresses.

ChenChen

Comments #1

(1) Comments from Referees

The manuscript deals with an important problem. The chosen approach is to search for correlations among available datasets. The manuscript is directed toward a very ship and nautical oriented audience. I encourage the authors to reconsider if the readership of NHESS is expected to have the appropriate ship orientation to appreciate the importance of this paper, and if the ship community is sufficiently aware of this journal for the paper to have the intended impact.

(2) Author's response

Thank you for your words recognizing the present study as an important problem! Regarding to your suggestion to reconsider if the NHESS is appreciate for publication of our study, we have the following considerations, which we hope can make it clear why we chose the NHESS.

At first, we submitted this study to the NHESS considering about the scopes of the NHESS given as follows, and we consider it appropriate to publish our study here since the NHESS did not refuse our submission directly due to the reason such as "out of scope of the NHESS".

"the detection, monitoring, and modelling of natural phenomena, and the integration of measurements and models for the understanding and forecasting of the behaviour and the spatial and temporal evolution of hazardous natural events as well as their consequences;

"the design, development, experimentation, and validation of new techniques, methods, and tools for the detection, mapping, monitoring, and modelling of natural hazards and their human, environmental, and societal consequences;"

Secondly, as you said the present study focuses on "a very ship and nautical" issue. But in our opinion, the differences between our study and most of traditional "very ship and nautical" studies are concluded as follows.

	Research objectives	Research approaches
Traditional "very ship and nautical" studies	Optimum design of ship's hull, ship maneuvering (in waves), ship speed loss, ship stability (in wind and waves), ship structure safety (in waves), etc.	Marine hydrodynamics (potential theory or CFD methods), marine structural mechanics (potential theory or CFD methods), ship model test in a towing tank, etc.
Our present study	Application of geophysical fluid dynamics (wave simulation of extreme wave states) to increase marine safety by avoiding possible marine accidents induced by rough nature environment.	Geophysical fluid dynamics (wave simulation by CFD), statistical method (correlation and regression analysis).

Finally, we consider it appreciate to be published on NHESS for two aspects. **One** is that it may also help the readership of NHESS to expand their horizons to contribute their experiences and knowledge of geosciences, which are usually lack of existence in researchers of ship field, to such important marine issues. **The other consideration** is that the ship community can also easily find this study by searching key words in scientific databases owning to the convenience of internet and various browsers at present, if they are willing to focus on a similar topic, just as what we have done in searching the study by Zhang Zhiwei, 2017.

Comments #2

(1) Comments from Referees

Near line 25: This is not a complete sentence: "Therefore, marine weather information, including an accurate forecast of extreme ocean surface wave states."

(2) Author's response

Thank you very much for your comments!

We have modified it in the resubmission to the sentence as shown in the following "Author's changes in manuscript".

(3) Author's changes in manuscript.

Therefore, an accurate forecast of extreme ocean surface wave states as well as the wave effects on ship navigation is essential for safe, economical, and environment-friendly ship navigation, from the viewpoint of ship weather routing.

Comments #3

(1) Comments from Referees

Near line 35: There are many different ways to define steepness, leading to different numerical values. This is not a problem as long as the definitions are clearly stated. You refer to others, and you give your own values. Please state which definition is employed by your references and by yourself. In particular, did your references use the definition you suggest in Table 3?

(2) Author's response

Thank you very much for your comments!

As you pointed out here, there are many different ways to define steepness, leading to different numerical values. And we have modified it in our resubmission as shown in the following "Author's changes in manuscript".

(3) Author's changes in manuscript.

It should be noticed here that the definition of wave steepness employed in the reference (Toffoli et al., 2005) is given as: $2\pi H_{m0}/gT_{\mathrm{m-10}}{}^{2}$, where the definition of H_{m0} by (Toffoli et al., 2005) also represents the significant wave height, as the definition of H_s; and the definition of $T_{\mathrm{m-10}}$ by (Toffoli et al., 2005) is the energy wave period: $T_{\mathrm{m-10}} = m_{-1}/m_0$, where the m_n is the nth-order moment of wave spectrum.

Comments #4

(1) Comments from Referees

Line 48: Substitute "serve" with "severe"?

(2) Author's response

Thank you very much for your comments!

We have modified it in the resubmission to the sentence as shown in the following "Author's changes in manuscript".

(3) Author's changes in manuscript.

From the ship accident statistics, they concluded that both the moderate, but rapid developing seas, as well as the seas more severe than the averaged local wave climate are closely related to the higher risk of ship accidents.

Comments #5

(1) Comments from Referees

In equations (2)-(4) it appears that k is used both as vector and scalar? Please state what k is, and please use different symbols for vectors and scalars. The symbol d has not been defined. Please use parentheses around a product if a differential operator is supposed to act on the product.

(2) Author's response

Thank you very much for your comments!

We think the reviewer is talking about equations (1)-(3), and we have modified them in the resubmission, as shown in the following "Author's changes in manuscript".

(3) Author's changes in manuscript.

$$\frac{\partial N}{\partial t} + \nabla_x \cdot (c_g + U)N + \frac{\partial}{\partial K}\hat{K}N + \frac{\partial}{\partial \theta}\hat{\theta}N = \frac{S}{\sigma} \quad (1)$$

$$\hat{K} = -\frac{\partial \sigma}{\partial d}\frac{\partial d}{\partial s} - k \cdot \frac{\partial U}{\partial s} \quad (2)$$

$$\hat{\theta} = -\frac{1}{K}\left(\frac{\partial \sigma}{\partial d}\frac{\partial d}{\partial m} + k \cdot \frac{\partial U}{\partial m}\right) \quad (3)$$

where N is the vector wavenumber spectrum, c_g is the wave group velocity, U is the current velocity, s is the coordinate in the direction of θ, d is the mean water depth, K is the wave number as a scalar, k is the wavenumber vector, m is the coordinate perpendicular to s, and S is the net source term for the spectrum, σ is the intrinsic

wave radian frequency.

Comments #6

(1) Comments from Referees

In line 216 it is probably better to say E is the variance of the surface elevation.

(2) Author's response

Thank you very much for your comments!

We have modified it in the resubmission to the sentence as shown in the following "Author's changes in manuscript".

(3) Author's changes in manuscript.

Here, the variance of the surface elevation is $\mathrm{E} = \int_0^{2\pi} \int_0^{\infty} F(f_r, \theta)\, df_r d\theta$, where $\sigma = 2\pi f_r$ is the intrinsic wave radian frequency, and $F(f_r, \theta)$ is the frequency-direction spectrum.

Comments #7

(1) Comments from Referees

Near line 258 a closing parenthesis is lacking.

(2) Author's response

Thank you very much for your comments!

We have modified it in the resubmission to the sentence as shown in the following "Author's changes in manuscript".

(3) Author's changes in manuscript.

As for the correlation between pitch motion and ship speed, as in the top-right panel, it is observed that the ship experienced similar speed loss in the beginning of the pitch motion increase (when the amplitude approaches 3 degree); while as the pitch motion increases from 3 to 6 degree, a larger and faster speed loss can be found in the half-loaded condition than that in the ballast one.