We thank the two anonymous reviewers for their useful comments to our manuscript. We found them valuable that helps to greatly improve the quality of the manuscript. Per your suggestion, we have carefully revised the manuscript (track-changed) following both reviewers' comments. Our point-by-point response (in blue) to the comments are as below:

Response to reviewer #1.

I have reviewed the manuscript [os-2015-93] titled "Common Characteristics of Directional Spreading-Steepness Joint Distribution in Freak Wave Events" by Liu and Yue. The authors constructed hindcast simulations of ocean conditions to analyze the wave parameters that closely related to freak waves. They found common visual features in direction spreading-steepness joint distributions when freak waves occurred. The common features seem obvious and interesting. The paper is generally written well and easy to follow. I have only minor comments, and suggest that the manuscript be published in OS.

We thank reviewer #1 for your encouragement. Our point-to-point response to your questions is as below.

1. The model used in the study is WAVEWATCH III (WW3), which is a spectral model to describe the statistic characteristics of ocean waves. It is impossible to simulate freak waves using WW3. How to build the connection between the simulated results and the freak waves is important, but unclear in the paper.

Response: We agree with the reviewer that in our previous version there were not enough information on the connection between the simulated results and freak waves. As the reviewer pointed out, it is impossible to simulate freak waves in WW3.

However, the freak wave-related parameters deduced from simulated results can be considered as an approximation of corresponding parameters of statistical sea states which is pertinent to freak waves. Some previous studies (Zakharov et al., 2007; Badulin et al., 2008; Toffoli and Bitner-Gregersen, 2011）have indicated that the freak wave only has a very limited influence on the statistical properties of ocean waves for its typically timescale is only few wave periods, and we have highlighted this in the first paragraph of Model Configurations:

2 Model configurations

As a state-of-the-art third generation spectral model, WAVEWATCH III (WW3) (Tolman, 2002, 2009) offers good descriptions of statistical sea states from a kinetic approach that well mimics directional spectrum. Short-lived freak waves can last only for ~~1 to 10~~ wave periods (Janssen, 2003) and hardly influence relatively long-time wave statistical characteristics (Toffoli and Bitner-Gregersen, 2011). ~~Nevertheless, even~~ in complex conditions, the evolution of spectrum with the spectral kinetic description appears to be consistent both qualitatively and quantitatively with solutions for the weakly nonlinear dynamical equations for ~~water~~ waves (Zakharov et al., 2007; Badulin et al., 2008).

In summary, our simulated results of sea states do not contain information of freak waves, although they can be used to indicate the conditions when with freak waves occurring. In the first paragraph of Model Configurations, more explanations

about freak waves and simulated results are added in order to avoid the confusions （Line4, Page4, os-2015-93-discussions-typeset_manuscript_modified.pdf(hereafter,os..pdf)）.

[Line 4, Page 4]:

that well mimics directional spectrum. Although the WW3 model cannot give the simulation of freak waves, the freak-wave related parameters deduced from simulated results can be considered as an approximation of corresponding parameters of statistical sea states that contain freak waves. Short-lived freak waves can last only for ~~1 to 10~~ a few

2. Page6, line14-17 “Tamura et al., (2009) and In et al., (2009) have introduced frequency peakedness-directional spreading joint distribution”. Where “Steepness” is used in the paper instead of “peakendness”. What’s the difference between steepness and peakedness in the joint distribution?

Response: We agree with reviewer that in previous studies, frequency peakedness-directional spreading joint distribution has been introduced (Tamura et al. (2009; In et al., 2009). However, in this paper, we tend to use ‘Steepness’ instead of ‘frequency peakedness’. The parameterization of ‘frequency peakedness’ in WW3 model adopted the method of Goda (1970), and is different in the parameterization of single-peaked spectrum and double-peaked spectrum. We find that there are always some abrupt changes in frequency peakedness when the spectrum switches from single peak to double peak. Goda’s approach to parameterize the frequency-peakedness is not always suited in double-peaked spectrum. So the frequency peakedness is not used in the joint distributions.

Freak waves are nonlinear phenomena essentially and wave steepness is the direct parameter to characterize the nonlinear level of ocean waves. So the steepness is adopted as the joint distribution factor. We also add some more explanations in the line 17, Page 6, os..pdf.

[line17, Page6]:

samples that they used in their research show similar visual feature. We find that there are always some abrupt changes in frequency peakedness when the peak number of spectrum varies. So the frequency peakedness is not used in the joint distributions. Freak waves are

3. Page5, Line26, “Burgers et al., (2008)” change to “and Burgers et al. (2008)”

Response:

We have corrected it according to reviewer’s comment. (P5, line26, os..pdf)

4. Page5, Line 4, “Where” change to “where”

Response:

We have corrected it according to reviewer’s comment. (P5, line4, os..pdf)

5. Page6, Line 14,”Tamura et al., (2009), In et al., (2009)” change to “Tamura et al. (2009) and In et al. (2009)”

Response:

We have corrected it according to reviewer’s comment. (P6, line14, os..pdf)