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Nonlinear Processes in Geophysics
Discussions
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Interactive comment on "On ZRP wind input term consistency in Hasselmann equation" *by* V. Zakharov et al.

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Question 1: Also, a large part of this manuscript is not new. The basic concept of a ZRP wind source term in relation to self-similar solutions has already been presented in Zakharov et al. (2012) . . .

Answer 1: Derivation of new ZRP wind input term was first presented in V.Zakharov, D.Resio, A.Pushkarev, New wind input term consistent with experimental, theoretical and numerical considerations, 2012 arXiv:1212.1069, which is not peer-reviewed preprint. So, the current publication is the first presentation of the subject in academic standarts media, essentially enhanced and upgraded.

Question 2: The fetch limited tests have already been presented in PZ 2016. This

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applies to most figures related to fetch-limited wave growth.

Answer 2: The fetch limited tests have been extended from 200 km to 300 km fetch, and all relevant figures have been upgraded.

Question 3:The only new results are related to checking the consistency of the new paradigm for duration limited wave growth. This in itself is too limited for publication in NPG.

Answer 3: The duration limited statement is as important as the limited fetch one. To the Authors opinion, studying of that situation itself in the context of self-similar properties of Hasselmann equation, would be sufficient for the publication in NPG.

The Authors, however, went extra mile for presentation of general view on the wind-driven ocean waves development through including also the duration limited results in the context of analytic, experimental and numerical self-similarity aspects.

Question 4: It is noted that physical basis of the new ZRP wind input is missing. It is constructed as a closure term to enable self-similar solutions.

Answer 4: The physical basis of the new ZRP wind input term consists in the fact that it is the analytical self-similar solution of Hasselmann kinetic equation for waves, derived from Euler equation for free water surface.

The absence of the physical basis would mean that one or several following points are true:

1. Euler equations for free-surface flow doesn't have physical basis.

2. The physical basis was violated during Hasselmann equation derivation from Euler equations

3. The self-similar solutions are not the solutions of the Hasselmann equation

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4. The physical basis has been lost during analysis of Resio and Long experiments 2004, 2007.

It is fare to ask the Referee #2 to elaborate, at which stage the physical basis was lost.

Question 5: There are hardly any comparisons against measurements, and the ones shown already appeared in PZ 2016. It is a shortcoming that no attempt has been done to compare the typical spectral shapes of Figure 7 and 17 with field observations.

Answer 5: The universality of $\omega\hat{}\{-4\}$ asymptotics for large frequency is the worldwide recognized fact, observed in multiple experimental field observations, accepted by the oceanographic society after the seminal work of O.Phyllips, 1985. Citation has been added to the new version of manuscript.

Question 6: The discussion of the results is poor, especially in section 4. Many figures are just mentioned with hardly any discussion. This also holds for the flow of the body text.

Answer 6: The discussion of the results has been enhanced in connection with the relevant figures.

Question 7: The number of numerical simulations is too limited to draw firm conclusions and the results shown are not convincing. Just consider Figure 11 where only 4 symbols should provide evidence of this set of source terms, or Figure 21 with only 7 symbols which do not even coincide with theoretical results.

Answer 7: The number of points have been increased along with zooming out of the significant area of the graphs.

Question 10: Details of the numerical procedure to handle the implicit damping are

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missing.

Answer 10: The new "Section 4 Numerical validation of relationship" have been added, which includes the "Subsection 4.1 The details of "implicit" dissipation"

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