

## ***Interactive comment on “Ocean swell within the kinetic equation for water waves” by Sergei Badulin and Vladimir Zakharov***

### **Anonymous Referee #2**

Received and published: 22 December 2016

The authors perform long time numerical simulations of swell evolution using the Wave Kinetic Equation (WKE). The authors first show that the Kolmogorov Zakharov analytical solutions of the WKE can be observed numerically; then the analysis is devoted to the study of self-similar evolution of the swell: at short time a fast drop of energy is observed while for larger times nonlinear interactions shape in a quasi-universal way the angular distribution of the spectrum. The results are in general interesting and new. However, before publication I would like the authors to comment on the following points:

- 1) The simulations are made for a very long time scale; could higher order effect in the kinetic equation take place (e.g. five wave interactions??)
- 2) Line 9, page 6: while discussing the two-lobe structure of the higher frequency part

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of the spectrum, the authors state that the the appearance of such structure is generally discussed as an effect of wind. This is only partially true, indeed, the role of nonlinearity in the formation of the lobes has been already discussed in Toffoli, Alessandro, et al. "Development of a bimodal structure in ocean wave spectra." Journal of Geophysical Research: Oceans 115.C3 (2010).

3) in eq. (16) the letter  $\nu$  has already been used for the degree of homogeneity of the wave action.

4) Please, comment more on the fact that the "wave action is the only true integral of the kinetic equation".

5) Please, explain what do the authors mean by "free boundary condition" (line 15 page 8)

6) How much the reduction of the wave energy ( $H_s$ ) depend on the high frequency cut off in the simulations?

7) English should be improved.

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Interactive comment on Nonlin. Processes Geophys. Discuss., doi:10.5194/npg-2016-61, 2016.

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