

**Inverse cascade spectrum of gravity waves in the presence of condensate: Numerical results
and analytical explanation**

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Abstract

Turbulence of gravity waves (waves with domination of gravity force, capillary effects are neglected) on the surface of sea or ocean is described by Hasselmann's waves kinetic equation. It is used for wave forecasting: prediction of evolution of waves distribution function dynamics over time. Some applications of it to practical problems will be discussed in introduction of the talk. Verification of Hasselmann's waves kinetic equation together with understanding of its range of applicability are important problems which motivate numerous numerical and laboratory experiments. In many of such experiments formation of strong long wave background is observed. Also, observed waves spectra in some cases are different from the ones predicted by the Waves Turbulence Theory based on Hasselmann's waves kinetic equation and introduced by V.E. Zakharov in late 60's. Results of massive numerical experiment (arXiv:2211.16567) are considered and explained analytically. We used scale separation technique together with diffusion approximation in the space of wave vectors to derive a new inverse cascade spectrum slope which is in good agreement with numerical results.

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