



Laboratory experiments on wave turbulence interaction

Hongyu Ma (1,2), Dejun Dai (1,2), Fangli Qiao (1,2)

(1) First Institute of Oceanography, Qingdao, China (djdai@fio.org.cn), (2) Function Laboratory for Regional Oceanography and Numerical Modelling, Qingdao National Laboratory for Marine Science and Technology, Qingdao, China, (djdai@fio.org.cn)

Surface waves play important roles in the upper ocean turbulence and mixing. Part of wave energy is transferred to ocean turbulence through wave breaking and wave-turbulence interaction. Laboratory experiments were carried out in wave tank to study the interaction between surface waves and turbulence. The length, width, height of wave tank are respectively 45m, 1.0m, and 1.8m, with water depth of 1.2m. Stirring grid was used to generate homogeneous and uniform turbulence, wave maker to produce mechanical surface waves. Acoustical Doppler Velocimeter (ADV) was used to measure the water velocity with frequency of 128 Hz. We carry out three kinds of experiments: only mechanical waves, only turbulence generated by vibrating grid, both turbulence and mechanical waves. Comparisons of experimental results shown that there are evident interaction between surface waves and turbulence, energy can be transferred from surface waves to turbulence, leads to increasing strength of turbulence, especially in wave trough.