Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Numerical investigation of wind over two progressive waves TAO
CAO, University of Minnesota — Wind-wave interaction is important in many applications and critical for the fundamental understanding of the wind-wave growth
mechanism. It has been found in present study that the growth of short wave is
suppressed in the presence of long waves, which is called the sheltering effect. In the
present study, we have carried out a direct numerical simulation (DNS) of wind over
two surface waves to improve the understanding of the sheltering effect. We have
observed that the sheltering effect on the short wave strongly depends on the wave
age of the long wave, thus the wave growth rate of the long wave. For the slow and
fast long waves, the magnitude of wave growth rate of the short wave is significantly
reduced compared with the cases with short wave only. But for the intermediate
long wave, this reduction is relatively small. Based on the DNS data, the budget of
energy conservation in the wave boundary layer is analyzed in detail.

Tao Cao
Univ of Minnesota - Twin Cities

Date submitted: 01 Aug 2016   Electronic form version 1.4