

Abstract Submitted  
for the DFD13 Meeting of  
The American Physical Society

**Measurements of turbulence in the airflow above surface waves<sup>1</sup>**

FABRICE VERON, MARC BUCKLEY, University of Delaware — We present experimental results on the details of the airflow above surface gravity waves for a several wind speeds, wave ages and slopes. The bulk of the results presented were obtained from a series of laboratory experiments that took place at the University of Delaware's Air-sea interaction facility. Airflow properties within and above the viscous sublayer were obtained using PIV, and wave profiles and spectra were measured by laser-induced fluorescence. We observe direct evidence of intermittent separation of the viscous sublayer past the crest of the wind waves. The separation leads to dramatic along-wave variability in the surface viscous tangential stress which in turn may affect wave growth and the air-water momentum balance. Despite the intermittent aspect of this phenomenon, ensemble averages of the wave phase-locked velocity products suggests the airflow separation yield significant flux of vorticity away from the surface thereby generating intense mixing and momentum transport within the airflow. These results hold for wind speeds that would normally be considered low to moderate. Implications for models of air-sea momentum flux will be discussed.

<sup>1</sup>Funded by OCE-0850663 and OCE-0748767 from the National Science Foundation.

Fabrice Veron  
University of Delaware

Date submitted: 02 Aug 2013

Electronic form version 1.4