

Abstract Submitted  
for the DFD11 Meeting of  
The American Physical Society

**Measurements of the Budget of the Subgrid-Scale Stress in Convective Atmospheric Surface Layers**<sup>1</sup> KHUONG NGUYEN, Clemson University, STEVEN ONCLEY, THOMAS HORST, PETER SULLIVAN, National Center for Atmospheric Research, CHENNING TONG, Clemson University — Measurement data obtained in the atmospheric surface layer during the recent Advection Horizontal Array Turbulence Study (AHATS) field program are used to obtain the subgrid-scale (SGS) stress budget. The array technique for obtaining the SGS stress was extended to include pressure sensors to measure the fluctuating pressure, enabling separation of the resolvable- and subgrid-scale pressure. The budget terms are analyzed using two parameters, the surface layer stability parameter  $-z/L$ , and the ratio of the wavelength corresponding to the peak of the vertical velocity spectrum to the filter size. For very large filter sizes, the budget terms show trends with  $-z/L$  that are similar to those of the Reynolds stress budget terms. For small filter sizes, the trends are very different, sometimes the opposite. The measured budget terms generally balance to within 10 percent. The results have implications for using model transport equations for SGS stress.

<sup>1</sup>Supported by NSF

Chenning Tong  
Clemson University

Date submitted: 04 Aug 2011

Electronic form version 1.4