Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

The coherent structure of atmospheric surface layers KAPIL CHAUHAN, NICK HUTCHINS, IVAN MARUSIC, JASON MONTY, The University of Melbourne — The structure of two-point correlation statistics in the atmospheric surface layer are studied from measurements on the western Utah salt flats at the SLTEST facility. Large-scale features in the stable, neutral and unstable surface layers that adhere to Monin-Obukhov similarity ($-10 < z/\zeta < 1$) are observed and are examined through two-point correlation of streamwise fluctuations R_{uu} (ζ is the Obukhov length, and z is wall-normal distance). The changes in R_{uu} with changing z/ζ are quantified by evaluating the integral length scales in the streamwise and spanwise directions and the structure inclination angle. Both streamwise and spanwise integral length scales show consistent logarithmic trends that increase with decreasing stability. Further, the structure inclination angle in the wall-normal plane also shows a logarithmic increase with increasing $-z/\zeta$ for the unstable surface layers. The changes in structure of R_{uu} can be characterized by z/ζ making it feasible to incorporate the trends in near-wall models of LES of atmospheric flows under stable and unstable conditions.

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Date submitted: 06 Aug 2010 Electronic form version 1.4