Abstract Submitted
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Buoyancy effects on large- and small-scale turbulent motions in the atmospheric surface layer during the transition through neutral stability[1] MEREDITH METZGER, University of Utah — The present study examines how the transitory nature of the atmosphere, both on diurnal and meso timescales, affects the evolution of Very Large-Scale Motions in the Atmospheric Surface Layer (ASL) during the transition through neutral thermal stability. It is hypothesized that the finite time duration of the near-neutral period arrests the development of VLSMs in the ASL, compared to those expected in a canonical turbulent boundary layer having equivalent Reynolds number; and that, this, in turn, affects the structure of the small-scale turbulence by impeding inner-outer interactions. These scientific questions are addressed using simultaneously sampled hot-wire and sonic anemometry time series obtained during a field campaign in Utah's western desert. The pointwise data span a wall-normal distance between 1 mm and 30 m above the surface over a time period of several hours centered around neutral transition. Velocity spectra as a function of time (i.e., thermal stability) are shown as well as statistics associated with the turbulent bursting process. Results are compared against those obtained both at lower Reynolds number in the laboratory and in the neutral ASL.

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