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**Influence of atmospheric stability on model wind turbine wake interface** AMELIA TAYLOR, VIRGILIO GOMEZ, SANTIAGO NOVOA, SUHAS POL, CARSTEN WESTERGAARD, LUCIANO CASTILLO, Texas Tech Univ — Differences in wind turbine wake deficit recovery for various atmospheric stability conditions (stratification) have been attributed to turbulence intensity levels at different conditions. It is shown that buoyancy differences at the wind turbine wake interface should be considered in addition to varying turbulence intensity to describe the net momentum transport across the wake interface. Mixing, induced by tip and hub vortices or wake swirl, induces these buoyancy differences. The above hypothesis was tested using field measurements of the wake interface for a 1.17 m model turbine installed at 6.25 m hub height. Atmospheric conditions were characterized using a 10 m meteorological tower upstream of the turbine, while a vertical rake of sonic anemometers clustered around the hub height on a downstream tower measured the wake. Data was collected over the course of seven months, during varying stability conditions, and with five different turbine configurations – including a single turbine at three different positions, two turbines in a column, and three turbines in a column. Presented are results showing the behavior of the wake (particularly the wake interface), for unstable, stable, and neutral conditions. We observed that the swirl in the wake causes mixing of the inflow, leading to a constant density profile in the far wake that causes density jumps at the wake interfaces for stratified inflow.

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