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LiDAR measurements of the Turbulent/non-turbulent Interface in the Atmospheric Surface Layer. GIACOMO VALERIO IUNGO, BEHZAD NAJAFI, MATTEO PUCCIONI, University of Texas at Dallas, SEBASTIAN HOCH, MARC CALAF, ERIC PARDYIAK, University of Utah, UNIVERSITY OF UTAH TEAM, WINDFLUX LAB, UT DALLAS TEAM — Wind velocity measurements have been performed in the atmospheric surface layer (ASL) with scanning Doppler wind LiDARs in order to characterize the turbulent/non-turbulent interface (TNTI), which is a shear-layer in the ASL separating the turbulent region from the non-turbulent region aloft. The TNTI plays a crucial role for the engulfment process, which consists in drawing large packets of non-turbulent fluid into the turbulent region leading to redistribution of TKE. This field campaign was performed at the SLTEST facility of the US Army Dugway Proving Ground center in Utah. The LiDAR velocity data are post-processed in order to retrieve the horizontal streamwise velocity component acquired simultaneously at different heights throughout the ASL height with a vertical resolution smaller than 1 m. The analysis of the velocity variance is used to detect the local height of the TNTI. The geometric characteristics of the TNTI, such as height and thickness, are analyzed together with its velocity gradient and variance. The conditional averaging of the velocity field as a function of the TNTI height shows velocity increases (reductions) that are consistent with Q4 (Q2) events and relative decrease (increase) of TNTI height.

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