Abstract Submitted
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Investigation of the Turbulent Bursting Period over a Very Large Reynolds Number Range[1] ENRIQUE ARCE-LARRETA, MEREDITH METZGER, University of Utah — The present study examines Reynolds number scaling of the average bursting period, T_b, over a Reynolds number range spanning three orders of magnitude, using hot-wire anemometry measurements from combined wind tunnel and field experiments. Wind tunnel data were obtained from the study of Klewicki and Falco (1990) at Reynolds numbers based on momentum thickness of $Re_\theta = 1010$, 2870, 4850; while the field data were acquired at the Surface Layer Turbulence and Environmental Test (SLTEST) facility at $Re_\theta = 5 \times 10^6$. Ejection events were detected from streamwise velocity time series using the U-Level algorithm of Lu and Wilmarth (1973). Events appearing in close succession were grouped into multiple event bursts using a statistical iterative approach based on pattern clustering. Four different Reynolds number scalings of T_b were investigated, namely: inner, outer, mixed, and intermediate. Data reveal that, of these four types of scalings, the Taylor microscale performs the best in removing Reynolds number dependencies in T_b. In addition, the present data reveal that outer scaled values of T_b decrease by two orders of magnitude over the range of Reynolds numbers; while inner scaled values of T_b increase by one order of magnitude.

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