

Abstract Submitted
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Automatic identification and characterization of bursting periods in a turbulent velocity field¹ RONI HILEL GOLDSHMID, DAN LIBERZON, Technion - Israel Institute of Technology, T-SAIL TEAM — A new automatic method for accurate detection of bursting periods in single-point velocity field records is presented. Identification of bursting periods is made by locating an instantaneous increase in the normalized “instantaneous” TKE dissipation rate, obtained using moving window averaging. Use of the record rms and average values for normalization eliminate the need to define flow specific thresholds, and hence decouples burst identification from the generation mechanism. This potentially makes the method universally applicable across various types of turbulent flows. The method performance is examined using a dataset of buoyancy driven turbulent boundary layer flow. Turbulent statistics of the identified non-bursting periods show distinguished similarity to those expected in canonical turbulence, while the identified bursting period statistics differ significantly. To examine the bursting period generation mechanism, statistical findings of temperature fluctuations are examined, and additional tests are provided to assist in identification of the generation mechanism. Examination of the flow field scalar variations in connection with turbulent bursting periods can assist in further understanding of bursting generation and scalar transfer processes.

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