

Abstract Submitted
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Determining Stationary Episodes in Field Observations¹ YING PAN, Pennsylvania State University, EDWARD PATTON, National Center for Atmospheric Research — Time-averaged turbulence statistics from field observations are required to educe theoretical relationships and to validate numerical simulations. Meaningful time averages rely upon episodes with stationary mean values. A novel approach to determine both the occurrence and duration of stationary episodes within time series is constructed. The reverse arrangement test, a classical technique providing robust measure of mean trends, is chosen as the basic statistical operation. The probability distributions of the starting and ending points of stationary intervals are used to determine (i) the nonstationary location at which a time period should be split into two sub-periods, and (ii) nonstationary samples that should be discarded from further analysis of time-averaged statistics. The approach provides an efficient technique to analyze long-term datasets, and is capable of relating data sampled at multiple locations. Applying the approach to data obtained within and above a walnut orchard canopy during the Canopy Horizontal Array Turbulent Study yields a clean relationship between the canopy-top mean wind and mean shear stress. Using this approach to determine stationary episodes is also essential for accurately determining a sonic anemometers coordinate system in the field.

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