Abstract Submitted
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Tall building wakes in isolation and in small clusters[1] J. A. MINIEN, S. H. CHOI, P. MCDONALD, S. SHONE, P. HAYDEN, M. PLACIDI, MATTEO CARPENTIERI, A. ROBINS, University of Surrey, ENVIRONMENTAL FLOW RESEARCH CENTRE TEAM — The last few decades have witnessed a significant increase in the world's population accompanied by a process of urbanisation. To accommodate the population density, tall buildings, both in isolation and in clusters, have become ubiquitous. These severely affect the local environment, influencing air quality, wind loading, and urban energy demand. Wind tunnel experiments were carried out within the EnFlo laboratory at Surrey that focused on the wake flow downwind of tall buildings. Data both for a single tall building with varying aspect ratios and for small groups of tall buildings were investigated. In the latter dataset, we varied the number of buildings, their aspect ratio, and the spacing between them. The overall objective of this work is to investigate the wake's scaling laws to aid the modelling of this phenomenon. Measurements were taken predominately using two-component laser doper anemometry within a canonical atmospheric boundary layer created by a combination of Irwin spires and roughness elements. During the presentation, we will discuss the wake development/decay and compare these to simple models based on two- and three-dimensional wake theories. Finally, we will present appropriate scaling laws and lengthscales necessary to model the wake flow.

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