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Characteristics of intermittent turbulence in flat and complex terrain: Cabauw and CIBA measurements

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Intermittent turbulence, i.e., extended periods with little or no turbulent activity interrupted by brief periods with significantly increased levels of activity, is a well recognized characteristic of the stable atmospheric boundary layer. Intermittency, however, has proved to be rather difficult to analyze in terms of traditional frameworks such as Monin-Obukhov similarity theory, local scaling, or spectral analysis. In addition, there is general acknowledgment of the importance of developing an improved understanding of the mechanisms that produce turbulent bursts or events being it in flat or in complex areas.

In this work the first results of an analysis and intercomparison between the mechanisms responsible to create intermittent turbulence in these two vastly different sites is made.

One year data from Cabauw and CIBA towers, representatives of a flat and complex terrain are analyzed in order to detect intermittent turbulent episodes. Afterwards row data corresponding to these episodes are treated using wavelet method, in order to detect if the mechanism responsible for this intermittency could be attributed to a shear generation, gravity waves or density currents. A preliminary statistics to investigate the role of the topography on the generation of these previous disturbances is examined and discussed.