P5.7 Rainfall measurement comparison between two types of disdrometers

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Accurate point measurement of the detailed features of rainfall remains a challenge. Tipping bucket rain gauges which are the most commonly used devices simply provide the temporal evolution of cumulated rainfall depth (through the time of each tip usually corresponding to 0.2 mm). Disdrometers, whose operational use is increasing, provide access to much more quantitative information such as the distribution of drops according to their size and velocity. Nevertheless the quantification of the uncertainty associated with these devices is still an open question. In this paper, the outputs of three collocated optical disdrometers recently installed on the roof of the Ecole des Ponts ParisTech are compared. A Campbell Scientific PWS100 and two OTT Parsivel installed perpendicularly are deployed. An interesting point of the experimental set up is that the two devices do not rely the same process; indeed the PWS100 computes the size and terminal fall velocity of each drop passing through the sampling area from the scattered light whereas the Parsivel ones do it from the occluded light. In a first step the raw measured size/velocity matrix (the data is binned) as well as the integrated values such as drop size distribution or its most common moments (rain rate, radar reflectivity) are analyzed for various types of events. Secondly all the moments are analyzed and not only at the maximum resolution but across scales in the framework of Universal Multifractals. They have been extensively used to characterize and simulate geophysical fields extremely variable over wide range of scales such as rainfall. The potential effects of wind are also investigated with the help of the two perpendicular Parsivel. Finally the implications of the observed differences on the algorithm computing rainfall rate from observed radar reflectivity which rely on strong assumptions on the drop size distribution are discussed.