EMS Annual Meeting Abstracts
Vol. 21, EMS2024-454, 2024, updated on 04 Nov 2024
https://doi.org/10.5194/ems2024-454
EMS Annual Meeting 2024

On the use of disdrometer data for characterization of precipitation episodes in the Basque Country

Santiago Gaztelumendi[1,2], Joseba Egaña[1,2], and José Antonio Aranda[1,3]
[1]Basque Meteorology Agency (EUSKALMET), Vitoria-Gasteiz, Basque Country
[2]BRTA, Tecnalia, Weather & Climate Area, Vitoria-Gasteiz, Basque Country
[3]Basque Government, Security Department, Emergencies and Meteorology Directorate, Vitoria-Gasteiz, Basque Country

Measurements are essential to provide information on the actual state of the atmosphere in order to improve our understanding of atmospheric processes and their role in water cycle and the climate system. In this paper we focus on measurements from optical disdrometers which seek to improve our understanding of complexity of precipitations processes at surface.

In this work we focus on the use of the basque disdrometer network a novel and evolving network with operational purpose. Deployed by the Basque Government, this network currently comprises more than 10 Parsivel OTT-2 disdrometers positioned across various locations in the Basque Country. Optical disdrometers function by gauging the degree of light obstruction caused by particles traversing a laser beam. When raindrops intercept the beam, a sensor detects a reduction in light intensity, which is then converted into an electric signal by a photodiode. This reduction in intensity corresponds to the size of the raindrops impeding the beam. Moreover, by analyzing the duration of this reduced intensity, the descending velocity can be estimated. Consequently, such instrumentation provides us with both raw information, such as raindrop size and velocity distribution, and derived data, including rain intensity, hydrometeor classification, reflectivity, visibility, etc., recorded every minute.

In this paper, we present a study focused on analyzing the key characteristics of precipitation episodes in the Basque Country. This analysis involves incorporating information derived from various aggregated indicators, which are based on selected event statistics such as maximum, minimum, mean, median, mode, percentiles, and others. These statistics are applied to various event variables, including duration, number of particles, rain intensity, total rainfall, raindrop size distribution, and more.

To accomplish the analysis, we prepare a comprehensive dataset spanning three years (2021-23) of precipitation episodes derived from minute-by-minute raw data recorded by the disdrometer network. The event raw data undergoes proper filtering and processing before being aggregated into precipitation episodes. These episodes are subsequently grouped based on shared characteristics or factors that facilitate analysis, such as predominant precipitation type, total precipitation amount, maximum intensity or season, among other categories. The ultimate goal is to identify patterns and common characteristics.