EVOLUTION OF RAINDROP SIZE DISTRIBUTIONS DURING A STRATIFORM PRECIPITATION EVENT IN THE CITY OF LEON (SPAIN)

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INTRODUCTION

Instantaneous measurements (minute by minute) allow to observe the natural fluctuations (both in time and space) the number of drops for each drop size range with a finer sampling than long timescale. The mathematical representation of all water droplets in the air is the "Drop Size Distribution" (DSD). Gamma distribution is commonly used to model this process. An event of light rain was recorded on 13 September with a duration of four hours. The raindrop size distribution was recorded every minute with a laser disdrometer.

STUDY AREA

Data were collected from July to the end of October 2015 , at the university campus of León, Spain (42° 36’ 50” N, 5° 33’ 38” W, 846 m asl).

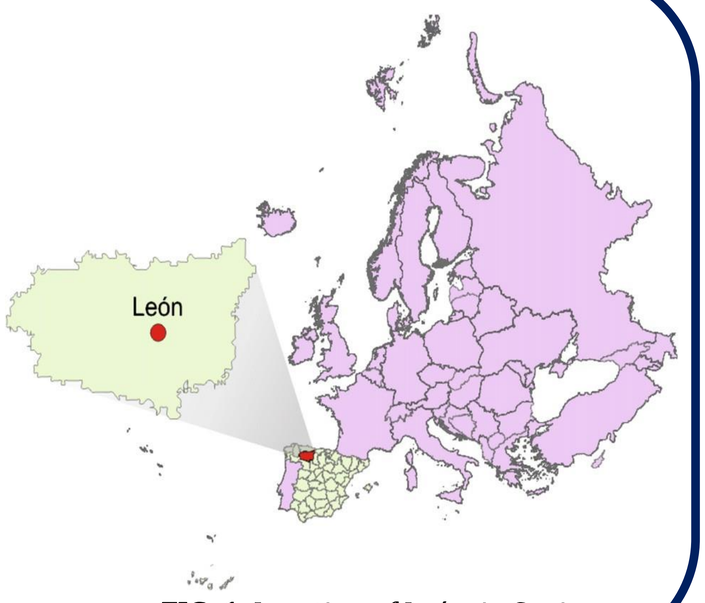


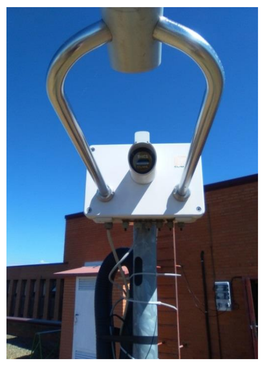
FIG. 1. Location of León, in Spain.

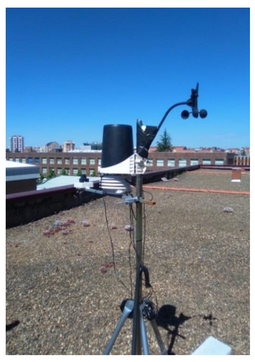
METHODOLOGY

SAMPLING

Laser disdrometer Thies LPM

Registered drops with diameters between 0.125 and 8 mm in 20 channels





Davis Weather Monitor II Station

Continuously registering the temperature and humidity

RESULTS and CONCLUSIONS

- Episode of light rain was recorded on 13 September with a duration of four hours.
- Accumulated precipitation of only 2.3 mm.
- Rainfall occurred softly and continuously, with a maximum rainfall intensity of 0.45 mm in 10 min.

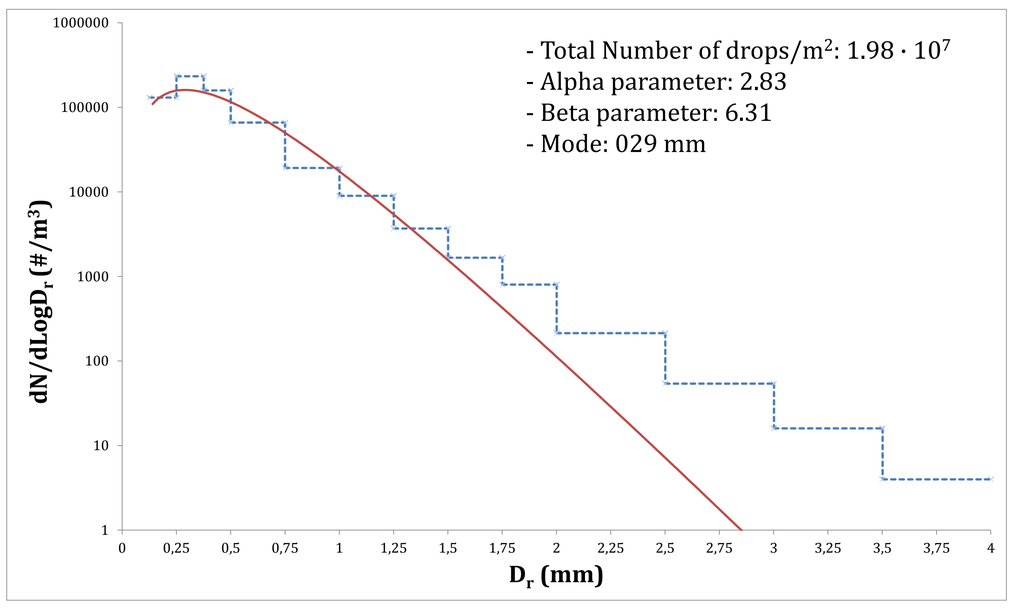


FIG. 2 Gamma distribution of drops of event.

- The event stratiform rain drops no greater than 3.5 mm size, being mainly smaller sizes to 1.75 mm.
- Gamma distribution is properly adjusted to the number of droplets in an episode of stratiform rain and can be used to model atmospheric processes such as scavenging caused by rain.
- Swept volume presents a similar intensity of precipitation pattern, although at the time that mode is greater, the swept volume is higher.

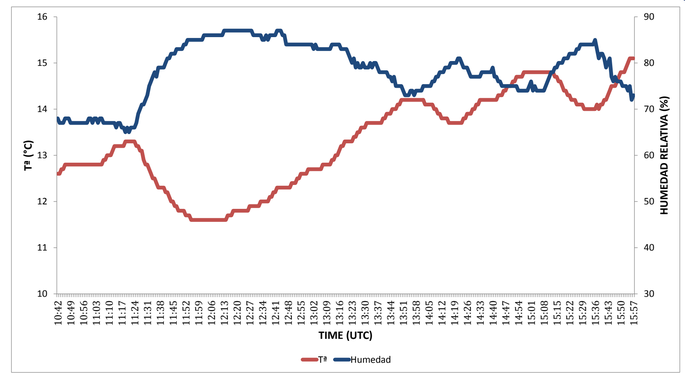


FIG. 3 Evolution of Tª and HR during event.

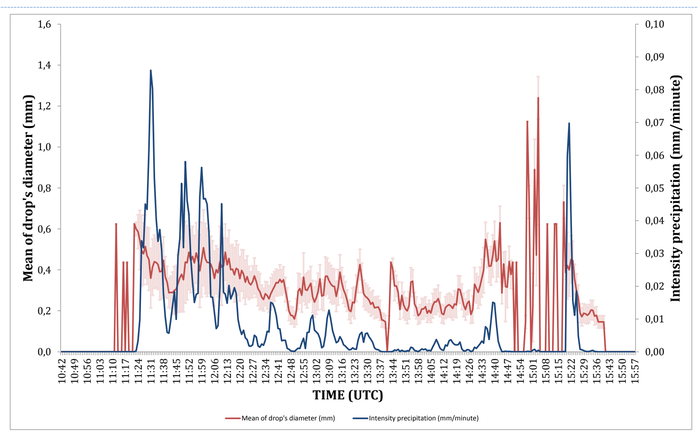


FIG. 4 Evolution of mean drops diameter and intensity of precipitation in the event.

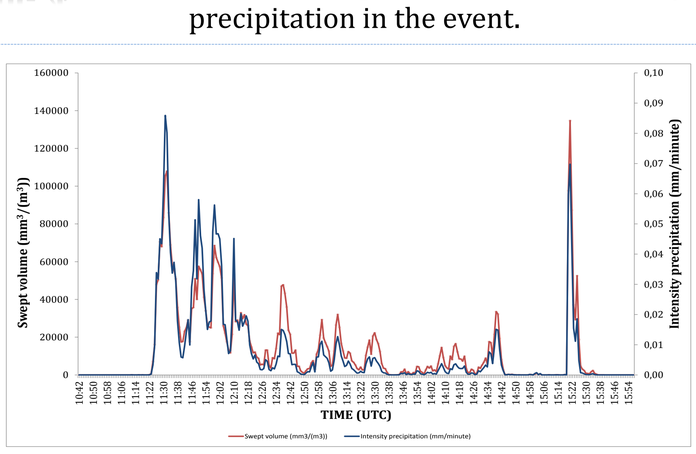


FIG. 5 Evolution of swept volume and intensity of precipitation in the event.

TABLE 2. Number of drops by channels of disdrometer.

Diameter (mm)	0.125	0.25	0.375	0.5	0.75	1	1.25	1.5	1.75	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
Drops (N/m2)	130112	232792	158224	65828	19136	8964	3688	1668	800	214	54	16	4	0	0	0	0	0	0	0	0	0

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