Geophysical Research Abstracts
Vol. 17, EGU2015-10309, 2015
EGU General Assembly 2015

Investigations on the links between rain intensity or reflectivity structures estimated from radar and drop size distributions

Sahar HACHANI (1,2), Brice BOUDEVILLAIN (1), Zoubeida BARGAOUI (2), and Guy DELRIEU (1)

(1) LTHE/CNRS-IRD-Université de Grenoble, France (brice.boudevillain@ujf-grenoble.fr), (2) Université de Tunis El Manar, ENIT/LMHE (zoubeida.bargaoui@laposte.net)

During the first Special Observation Period (SOP) of the Hydrological cycle in the Mediterranean Experiment (HyMeX, www.hymex.org) held in fall 2012 in the Northwestern Mediterranean region, an observation network dedicated to rain studies was implemented in the Cévennes region, France. It was mainly constituted by weather radars, micro rain radars, disdrometers and rain gauges. Observations are performed by a network of 25 OTT Parsivel optical disdrometers distributed with inter-distances ranging from a few meters up to about one hundred kilometers. This presentation focuses on the comparison of one optical disdrometer observations located at Villeneuve-de-berg to observations using weather Météo-France / ARAMIS radar located at Bollène which is in a neighborhood of 60 km from the disdrometer.The period from September to November 2012 is studied. To analyze the structure of the rain observed by radar, a window of investigation centered on the disdrometer was selected and the mean spatial values, standard deviation, gradients, and intermittency of radar reflectivity or rainfall intensity were computed for a time step of 5 minutes.Four different windowsizes were analyzed: 1 km^2, 25 km^2, 100 km^2 and 400 km^2. On the other hand, the total concentration of drops Nt, the characteristic diameter of drops Dc, and a Gamma distribution shape parameter μ were estimated. Gamma distribution for the DSD related to disdrometer observations was estimated according to the modeling framework proposed by Yu et al. (2014). Correlation coefficient between intensity R obtained by the disdrometer and windowaverage R estimated using radar data is nearly 0.70 whatever the window. The highest value is found for the window 25 km^2 (0.74). Correlation coefficients between Dc and window average R vary from 0.35 for the window 1 km^2 to 0.4 for the window 400 km^2. So, they areweak and not sensitive to the choice of the window. Contrarily, formean radar reflectivityZ, correlation coefficients with Dc, Nt and μ vary to some extent from the window size 1 km^2 to the window size 100 km^2. The most sensitive is the correlation coefficient between Z and Nt. However it presents the smallest correlations while the highest correlations are found for Dc (respectively 0.80 and 0.74). The overall of relations between the rainfall structure variables and DSD parameters will be presented in the communication with a special attention to the weather and/or rainfall types (orographic, stratiform, and convective).

References:
Yu, N., Delrieu, G., Boudevillain, B., Hazenberg, P., and Uijlenhoet, R., 2014: Unified formulation of single and multi-moment normalizations of the raindrop size distribution based on the gamma probability density function. Journal of Applied Meteorology and Climatology, 53, pp 166-179.