Hydrology and Earth System Sciences Discussions

Interactive comment on "Characteristics of 2-D convective structures in Catalonia (NE Spain): an analysis using radar data and GIS" *by* M. Barnolas et al.

Anonymous Referee #1

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The Authors study the characteristics of convective structures in Catalonia in order to model them for a forthcoming flood model simulator. From 2d radar images, convective strcture are selected and their statistical properties studied. Geometrically convective structures are approximated with an elipse and the precipitation is approximated by the mean areal precipitation. I consider this an interesting contribution. However I do not recomend it for publication as it is. In particular, I think the Authors do a poor job (see major issues below) in quantifying in a objective way the agreement between their model characerization of convective structure and the observed 2d radar properties.

I am sure the Authors can produce a better revised version of the manuscript which address the following issues.

MAJOR ISSUES

Fig. 5: The reader is left to judge visually the goodness of the fit. The use of probability density functions and the scale of the y-axis makes it difficult to judge the agreement especially in the tails. I think that a plot of cumulative function is more appropriate. together with a log-log plot for the Pareto fit and log normal. Moreover, a quantitative measure of fit goodness (E.g. Kolmogorov-Smirnoff test) must be used: the fit of the orientation with a GEV looks quite "awful" (probably will not pass the KS test a 5% confidence).

I think the Authors should also quantify what the goodness of the Q-Q plot. They claim that the "cumulated rainfall value do not seem to differ significantly between them". Judging just from the plot of Fig. 7 I do not reach their conclusion. E.g. 0.24 for Pradar correspond to circa 0.28 for Pellipse which is a relative difference of 0.04/2.4=16% which I would not judge as negligible. Same relative discrepancy occurs for 0.96Pradar which corresponds to circa 0.8 for Pellipse. While 1.44 Pradar corresponds to circa 1.15 Pelipse for 20% relative discrepancy. The Authors must do a better job in quantifying objectively the discrepancy between model and observations. What are the consequences of 16-20% discrepancy for the purpose of flood prediction?

METHODOLOGY ISSUES ON THE IDENTIFICATION OF CONVECTIVE STRUCTURES

pg. 4711 line 16: why the threshold is set to 43dBz? It seems that a reader has to go Llasat 2004 to have an idea of why this particular value. It should not be so. This is an important threshold for the methodology and its choice should motivated.: e.g add a brief sentence which described the "physical" motivation for the choice of this particular value and again the reference to the manuscript where a detailed description of the motivation can be found.

pg. 4711 line 20: considered function ?. If the choice a threshold of reflectivity has a straightforward physical motivation (convective cell are associated with heavy rainfall rate) the gradient criteria is not immediately evident. Of course the motivation for this criteria is in the cited literature but it would be better to have a short sentence to describe the physical motivation.

pg. 4711 line 22: "adjacent". Does adjacent "mean" only left-right and up-down neighbors? Or also diagonal neighbors?

pg. 4725 Table 3: The values of the Minor axis are not sound. E.g 0.04km, how is possible if the smallest pixel is 2x2km^2??

NOT PROPER ENGLISH OR LOGICALLY FLAWED

pg. 4708; lines: 6-7; "in the lowest level", what does it mean exactly? (the lowest possible resolution of the radar?) . Use "at the lowest possible resolution" instead

minor pg.: 4708; lines 19-21; "The first authors obtain these results from the analysis of convective cells in tropical precipitation and the others for convective cells at mid-latitudes." Please change into "The first authors adopt the exponential profile as best choice for convective cells in tropical precipitation and the others for convective cells at mid-latitudes."

pg. 4709; lines: 10-12; "As the use...." till to "suitable format". Please write this sentence in proper English or simply eliminate it.

last line of pg. 4709 and first 3 lines of pg. 4710. another example of not proper English. Please fix it. ("Even this way"!??, "volume ... is much higher" !??).

pg. 4710; lines 5-16. Please improve the presentation because it is very confusing and not logically sound. Do not start a sentence with "beta parameter is". What is the meaning of "some" on line 13: not all of them! Ok but if you select "some" how do you select them and which criteria you adopt?. Also provide a reference for the MEDEX proposed criteria for heavy rainfall.

MINOR ISSUES

pg.: 4707; lines: 15-16; please correct spelling of "Garcia-Batual"

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