

## ***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.***

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General comment: the paper addresses the very interesting and living issue of the analytical description of the rain structures, based on radar data collected in Catalonia. The results are a first step towards the development of a complete rain cell model for hydrological purposes. However clarifications are necessary on some crucial aspects before the publication.

Specific comments:

1) page 4708 lines from 10 on. The review of the rain cell models is quite generic and

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should be improved. It is not clear to the reader if the authors make specific reference to one of them for what concern the parametrization of the rain cells used throughout the work or if they are proposing a different one(see page 4716). The author could benefit to have a look to the following papers: a) C. Capsoni, F. Fedi, C. Magistroni, A. Paraboni, A. Pawlina, "Data and theory for a new model of the horizontal structure of rain cells for propagation applications," Radio Science, Volume 22, Number 3, Pages: 395-404, May-June 1987. b) C. Capsoni, M. D'Amico, P. Locatelli, "Statistical properties of rain cells in the Padana Valley," Journal of Atmospheric and Oceanic Technology (JTECH), Vol. 25, Issue 12, December 2008 where the same issues have been already faced.

2) page 4709 line 13. Why small (?) cells can be neglected? Could this assumption impact on the statistical results? Please discuss this point.

3) page 4710 line 23. The radar database used in the study should be better introduced with emphasis on the pre-processing used to generate the rain maps. I am wondering if it is really possible to use data coming from a C band radar up to 240 km. As well known, the %GHz frequency suffers from non negligible attenuation due to rain, when crossing heavy rain (convective precipitation). My strong feeling is that long range data are likely to be biased in many cases. (You "see" rain less/far less intense than the actual one or you could not see any rain)

4) page 4710 line 27. Where the 12 dBz value comes from?

5) page 4711 first paragraph. Is the database used in this study statistically meaningful? This statement is not given in the paper. Does it represent a correct statistical description of the convective structures in Catalonia? If yes, please support this point. This is a key issue; otherwise the statistical analysis that follows loses and meaning.(see reference b) above)

6) page 4713 line 4. The actual meaning of the parameter thickness is not clear. please specify better.

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7) Sect. 5. The authors should give a clear analytical definition of the parameters (rainfall field, convective structure....) used to describe the rain cells by showing the relationships for their computation. Other authors use different parametrizations. (for instance Feral et al. cited in the introduction, seems to use a completely different parametrization from the one here proposed, but no mention of this issue was made)

8) Is equation 1 used throughout this study?

9) sect. 6 Is there any other similar study to which compare the results presented in this paper? The paper could benefit of it.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 4705, 2009.

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