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Hydrology and Earth System Sciences Discussions



# *Interactive comment on* "On the nature of rainfall intermittency as revealed by different metrics and sampling approaches" *by* G. Mascaro et al.

**Anonymous Referee #2**

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This paper has been a joy to read because it is so well presented and the concepts are very clearly explained (although see a couple of detailled issues below). The issue of rainfall intermittency is a very important one as dry periods enable a catchment to absorb any prior rainfall thus modifying its response to further rainfall. It is then of particular interest to read a comprehensive study on a very rich data base in which a number of interesting issues are tackled.

The paper examines three topics under the general heading of intermittency. 1. The authors examine several metrics for the quantification of intermittency (and clustering), looking in particular at the range of time-scales that these identify. 2. The impressive spatial distribution of the data enables them to carry out a spatial analysis of these



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Interactive Discussion
Discussion Paper

metrics' variability. 3. Importantly, they examine to what extent the chosen 'measurement theory' of the measurement instrument, i.e. the tipping-bucket raingauge, leads to differences in the above results (the measurement theory here is just the means by which tip-times are converted into rainfall intensities).

Among the important outcomes of the authors' work, I would like to single out the following as being very useful for hydrologists: a. the small spatial variability of intermittency metrics in space will be of much use for sparesely gauged catchments b. the fact that the choice of measurement theory, i.e. the widely used DC (discrete counting) method a opposed to the authors' very sensible proposal, the CC (continuous counting), can have a noticeable impact upon intermittency metrics up to scales coarser than 1 hour, is a very important result that may lead hydrologists to rethink how they translate tip-times into intensities c. the robustness of the multifractal partition fraction exponent K with respect to the choice of measurement theory, is a very useful result for modelling purposes.

I have to acknowledge the author of the previous comment on this paper, as he/she has done a splendid job of picking out typos and suggesting improved turns of phrase, so that I do not need to address these issues.

I have the following issues of detail:

Page 9972 - line 1 typo: 'systematically'

Page 9972 - line 17 Given the importance of elevation here it would be interesting to know if the kriging that is referred to is actually co-kriging with elevation, or not

Page 9973 - line 16 suggest substituting 'autumn' for 'fall'

Page 9973 - line 29 and in following pages suggest substituting 'gauge' for 'gage' (American journals insist on the latter spelling, but this is a European journal, so I suggest sticking to British English spelling)

Page 9978 It is difficult to develop an intuitive understanding of what the metric X_t



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9, C5314–C5316, 2012

Interactive Comment



represents. Could the authors add something here to help the reader?

Page 9980 The authors should be lauded for a particularly clear presentation of the meaning of small or large K(3)

Page 9988-9 the CC method is a very sensible approach; I would just comment that the authors indicate that it is practically never the case that there are non-spurious isolated tips in their data set (for which cases it is not clear how the conversion to intensities should proceed). This does not seem surprising for Sardinian rainfall, but itis however not the case for some more drizzly climates. As drizzle may be hydrologically relevant, it would be interesting to have the authors' view on how the method could be extended to such cases.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 9967, 2012.



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9, C5314–C5316, 2012

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