

Interactive comment on “Multivariate design via Copulas” by G. Salvadori et al.

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The manuscript describes the theoretical framework to define the multivariate return period using copula function. The topic is surely interesting and the manuscript could help to solve some methodological problems still present in the copula application.

My evaluation is more than positive and in the following some suggestions to improve the paper before publication are listed.

General comment

I would suggest the authors to try to make more readable the manuscript since in some sections or part of it the mathematical language is too heavy to read.

Section 1. Introduction

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I would include in the introduction the lines (page 5546 - lines 21-27) present in the “Conclusions” indeed it could be important to underline the topic evolution starting since 2004 with the first paper provided by the authors and also to better specifying the multivariate return period application attempts of other copula users.

page 5526 line 4 “a natural total order in multi-dimensional Euclidean space” is not fully clear...could it be written in easier way?.

page 5526 line 11 I would remove “in a meaningful way” from the crucial question

Section 2. The case study (the section title could be more appealing)

page 5528 line 3-14 the triangular shape is old-fashioned, you could choose an approach like: Serinaldi F., Grimaldi S., Modeling flood hydrographs by distribution functions with finite support, Journal of Hydrologic Engineering, 16, 434 (2011); doi:10.1061/(ASCE)HE.1943-5584.0000339 (13 pages). but I understand that this is just to provide a practical results of the proposed methodology.

page 5528 line 21 It could be appropriate a reference for the two tests (like an handbook) although they are well known.

page 5528 line 26 “remark 1” flag could be removed. Also “unskilled” should be removed, while the warning stated in text is really appropriate.

page 5529 line 25-27 these lines should be included just before in the Fig. 2 description indeed the reader is surprised by the so high concordance of Q and V.

page 5529 line 29 it could be added also the reference: Serinaldi F., Bonaccorso B., Cancelliere A., Grimaldi S., Probabilistic characterization of drought properties through copulas, Physics and Chemistry of the Earth Journal, 34 (10-12), pp. 596-605, 2009.

page 5530 line 13 it could be also added the reference: Serinaldi F., Grimaldi S., Fully nested 3-copula: procedure and application on hydrologic data, Journal of Hydrologic Engineering 12 (4), pp. 420-430, 2007. Section 3. Multivariate return period

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page 5531 line 1-20 it is quite heavy to read....if it is removed or simplified.... it could help the non-math reader.

page 5534 line 2-5 these lines could be removed or better explained.

page 5537 line 20 I would remove the citation of PhD thesis (Zhang 2005)

Section 5. Design event

page 5540 line 6 "Remark 8" could be removed...it seems out of topic

page 5540 the function "W" is practically explained in the sub-section 5.1 but I would give here a practical example just to allow the reader to understand here the idea.âÃ

Section 6. Conclusions

page 5546 line 1-10 I would not include an other test in the conclusion....so this could be put in the section 5.1

page 5546 line 11-20 this comments can be removed.

page 5546 line 21-27 as explained before I would stress this point in the introduction

page 5547 line 6-9 I would remove it

Conclusion should be rewritten underlying what the author did in the paper and what is the next step.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 5523, 2011.