

Interactive comment on “Effect of climate change and variability on extreme rainfall intensity–frequency–duration relationships: a case study of Melbourne” by A. G. Yilmaz et al.

Anonymous Referee #1

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General remarks: The topic of the manuscript is of high relevance for the scientific community. Effects of climate change on the “Intensity-Frequency-Duration” relationship of precipitation might have enormous effects on society, so the analyses of the historic development of this relationship can give us important insights. The manuscript is well written and structured. The chosen tools and techniques fits to the topics, but the description of some of the techniques should be improved. The outcomes are described in a proper way except the results of the deviance tests. The discussion of these results should be extended. The conclusions are quite short and should be extended.

Minor remarks: (Trenberth et al., 2007) and IPCC (2007) refer to the same source.

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(Hu,2013) (p. 6319, line 17) is not listed in the references "urban flash flood producing hourly rainfall intensities" is mentioned several times (p. 6312, line 22; p.6326, line 19; p.6329, line 9) but never defined. It should be clarified which thresholds or return periods are relevant for “urban flash flood production” in Melbourne. p.6315, line 16, 25 "La Lina" instead of La Niña. p.6318, line 27+28 are redundant p. 6320, line 4+5. The test of data dependency must be done just once. p.6319, line 8. "Too high threshold selection decrease the bias, but increases the variance (...)" – this statement is clear concerning the variance, but not for the bias. Please include a short explanation. p.6321 line 3, (Formula (1)): in the description of the formula the terms “sigma” and “gamma” are used. Later in the text (p. 6322) the terms "scale" und "shape" parameter and in p. 6323 the shape parameter is named zeta instead of gamma. The notation should be harmonized. p. 6322 Formular (2): Bracket is missing p. 6322, line 26: "(...) it is not realistic to attempt to estimate the scale parameter (...)" should be the "shape parameter" p. 6323, line 6+7 "It should be noted that the exponential function has been adopted to introduce time dependency in the scale parameter to ensure the positivity of sigma.". There are several functions which never gets negative. So this is not an explanation why an exponential function is chosen. p. 6323 line 16f – The explanation of the "deviance tests" is quite rudimentary – and also the discussion of the results of this test (p. 6325).

p. 6323, line 23: " χ^2_k distribution": - write it explicitly (chi square) or "chi", but not x , is misleading. section 5 (conclusion): The results of section 4.5 (impact of IPO) is not mentioned in the conclusion..

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