We thank the Reviewers for their valuable and useful comments on this manuscript. Their suggestions will further improve our manuscript and we are certain that we can address the comments in the revised manuscript. Many of the Reviewers' comments highlight the complexity of the problem this paper seeks to address. We hope that this manuscript will add clarity on how storm design and risk might change in the changing world we live in. Please see below our response to each of the reviewers' comment.

Interactive comment on "Frequency Analysis of Extreme Sub-Daily Precipitation under Stationary and Non-Stationary Conditions across Two Contrasting Hydroclimatic Environments" by Eleonora M. C. Demaria et al.
Anonymous Referee #2
Received and published: 16 August 2017

We thank the Referee for the valuable and useful comments on this manuscript. We believe that their suggestions will further improve our manuscript.

The paper aims to use observed sub-daily summer (June-October) precipitation intensities from two ARS sites to test for evidence of temporal trends and to build IDF curves using Annual Maximum Series (AMS) and Partial Duration Series (PDS) approaches and a Bayesian method that takes into account the non-stationarity of the time series, using this last approach for a failure analysis addressed to infrastructures that are designed with a stationary approach. The paper is interesting and in the line of some recent literature on the topic. There are few major points to be discussed:
1) The proposed Bayesian approach is interesting but some more details should be provided about the likelihood function and the verification of homoscedastic distribution of residuals. The test is needed if the adopted bayesian likelihood functions is based on such restrictive hypothesis. Otherwise the hypotheses behind the Bayesian approach should be clearly stated (Liuzzo et al. 2017)
The Reviewer raises an excellent point. We will include plots showing the distribution of residuals in the revised version of the manuscript.

2) I understood that Bayesian approach was adopted only for those raingauges for which a local trend was identified (while possible regional crosscorrelation was eliminated by means of RAMK). Bayesian approach is able to generally provide information even if a formal trend cannot be determined providing a sort of "tendency" of the time series to show a trend in the future. This approach can be also replicated in the proposed study with the aim of showing a more general risk analysis

We thank the Reviewer for the comment. We did include all trends, statistically and non-statistically significant, in the Bayesian analysis. However, we only included in the Figures those trends that were statistically significant. We will incorporate those cases in the revised manuscript.

Lorena Liuzzo, Vincenza Notaro, Gabriele Freni (2017) Uncertainty related to climate change in the assessment of the DDF curve parameters. Environmental Modelling & Software Volume 96, October 2017, Pages 1-13

The text is generally well structured and the figures are all informative. I suggest the publication after the comments are addressed.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2017-247, 2017.