Interactive comment on "Modelling and assessment of urban flood hazards based on rainfall intensity-duration-frequency curves reformation" *by* Reza Ghazavi et al.

Reza Ghazavi et al.

ghazavi@kashanu.ac.ir

Received and published: 29 November 2016

Referee #2: nhess-2016-304-RC2 First of all, we should thank very much for your great effort regarding our manuscript. Thank you very much for your great favor regarding our manuscript. The scientific comments and suggestions on the language and structure of the manuscript were really helpful. We have modified the manuscript accordingly, such that the detailed corrections are listed below point by point. Please do not hesitate to inform us regarding any extra comments/considerations

Referee #2: This research paper attempts to model and evaluate urban flood hazards in a region of Iran. The paper is difficult to read because of the poor English language used by the authors and very weak since several research aspects need to be better

stated and analyzed. Authors answer: We edit our manuscript for a better language condition. All highlighted sentences and punctuated errors were modified.

Referee #2: The general objectives of the work are stated at the end of the introduction and they are not well discussed. Authors answer: This sentences edited at the end of introduction. Also discussion and conclusion parts of paper edited.

Referee #2: The authors want to compare the impact of the use of two IDF curves on the urban drainage system. At the beginning of the work they declare to have derived a new IDF curve but in the central part of the manuscript also this second IDF curve is provided by other studies. Authors answer: The objective of this study was to investigate the effects of rainfall IDF curves change on the flood properties (runoff peak and volume). Two type of hydrograph were used: Sherman method proposed based on rainfall data of 1972-1993. At the first time, this hyetographs used as the input of SWMM model for estimating peak and volume of runoff. In 2004, rainfall IDF curves were updated by Ghahreman and Abkhezr (2004), using long term rainfall data (1972-2004), so new climate condition was considered. A new general relationship for rainfall IDF curves was introduced. At the second time, design hyetographs of the study area was prepared via rainfall IDF curve generated via Ghahreman and Abkhezr method. This hyetographs was also used as the input of SWMM model for estimating peak and volume of runoff. We concluded that change in estimated runoff related to climate change.

Referee #2: Please, see attached the annotated file with further comments and suggested edits. In my opinion the paper must be deeply revised before to be reviewed again. Highlighted sentences require revision. Authors answer: The manuscript edited based on further comments and suggested edits in attached file. Also highlighted sentences and punctuated errors were modified.

Referee #2: In P 8, L 205, Referee wrote so, which is the value of the concentration time? And also referee wrote in P9, L 230, Zanjan rainfall hyetographs in different

return periods in time intervals of 10, 20, 30 and 40 minute was prepared using rainfall IDF curves of the year 1995. Referee wrote why this values (i.e. up to 40 min? is this time of concentration?) Authors answer: As you know maximum flood occur when rainfall duration is equal to time of concentration. Since this urban watershed has 16 sub-basin (Table 1) with different time of concentration, so hyetograph of each sub watershed was prepared separately (16 hyetograph based on Sherman method and 16 hyetograph based on Ghahreman and Abkhezr) based on time of concentration of each sub watershed. Estimated maximum runoff of one sub-basin (Sub-basin number 16) was indicated in figure 7. The presented time of concentration (40min) is also time of concentration of this sub basin.

Referee #2: in P 9, L 234. Referee wrote how about statistical methods??? Where does equation 5 come from? And hourly properties from daily statistics? Authors answer:

These synthetic equations proposed by Sherman to generate rainfall IDF curves and hourly rainfall with 10-year return period in Iran. Rainfall data of 66 rain gauge stations extracted and analyzed for preparing rainfall IDF curves. The Equation 5 is an empirical equation proposed after analyzing the data of Maximum of daily precipitation, average of annual precipitation and the number of rainy days After that, Ghahreman and Abkhezr found that the maximum of daily precipitation and average of annual precipitation had significant effects on estimating the hourly rainfall with 10-year return period. As mentioned in the text, R_1440^2 is the average of the maximum daily rainfall. The amount of R_1440^2 calculated based on the average of maximum of daily precipitation data from 1969- 2015 in Zanjan station.

Referee #2: in the resulting of model calibration (P12, L 295 -305) referee wrote how about the initial conditions???? Which is the operational temporal scale? 10 min? Authors answer: In this study, for model calibration, rainfall and runoff measured in 10 minute interval for three events in one sub basin. The area of this sub basin was 4.6 km2. As all sub-watershed have same rainfall and land use condition, the calibrated

C3

model was used for the study watershed. This explanation added to text

Referee #2: in P 16 in the conclusion referee wrote which is the contribution of this work??

We improve this paragraph.

Base on both reviewer comments, we improve this manuscript. Please let we know for any extra information or comment.

Please also note the supplement to this comment:
http://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2016-304/nhess-2016-304-AC2-supplement.pdf