

## ***Interactive comment on “Prediction of direct runoff hydrographs utilizing stochastic network models: a case study in South Korea” by Y. Seo and S.-Y. Park***

**Anonymous Referee #3**

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The manuscript proposes a combination of synthetic width function and rainfall-runoff model based on the width function for hydrograph estimation in ungauged basin.

While the topic is interesting as appropriately underlined in the introduction, I have some doubts on the methodology proposed by the authors.

It seems a contradiction combining the proposed methods indeed the main advantage of WFIUH models is the simplicity and the possibility to extract the information from the DEM.

I agree with both reviewers and in the following I will list other comments.

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1) It seems from the introduction that are not available in literature attempts to adapt the WFIUH approach to ungauged basins. Actually, I personally did an effort to reach this aim and the results are available in the two following publications:

Grimaldi S, Petroselli A, Alonso G, Nardi F (2010). Flow time estimation with spatially variable hillslope velocity in ungauged basins. *ADVANCES IN WATER RESOURCES*, vol. 33, p. 1216-1223, ISSN: 0309-1708, doi: 10.1016/j.advwatres.2010.06.003

Grimaldi S, Petroselli A, Nardi F (2012). A parsimonious geomorphological unit hydrograph for rainfall runoff modeling in small ungauged basins. *HYDROLOGICAL SCIENCES JOURNAL*, vol. 57, p. 73-83, ISSN: 0262-6667, doi: 10.1080/02626667.2011.636045

2) From these latter papers it is clear that I do not see any added value in using a stochastic approach to simulate synthetic drainage networks since the DEM is full of information useful for appropriately estimating the WFIUH.

3) The proposed case study seems not appropriated. Indeed, in my opinion, the application of WFIUH should be limited to small watershed and surely not to a basin of thousands of Km<sup>2</sup>. Moreover the case study does not include any DEM analysis or preprocessing and the watershed is resampled (I am not sure to have well understood) in a raster of 24\*28 cells...that means that the lattice resolution is around of 3Km\*3km. This is not reasonable for WFIUH approach (the hillslope component would be included in the channel component).

4) Figure 4 is particularly representative of my concerns. Why should we simulate that drainage networks? the DEM could tell us which the most similar to the real one.

5) In general the proposed application does not include enough information, for instance, it is not clear how the rainfall data are managed.