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 #2

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The paper aims to reproduce the actual channel network using a stochastic Gibbsian model, then to calculate a unit hydrograph width function which can be used in modelling runoff on ungauged basins. An application case is shown on three rainfall/runoff events on one Korean catchment. My main comments concern:

- The originality of the approach: the paper doesn't state clearly the limitations of the existing approaches and the added-value obtained with the method proposed herein. It is not clear why to model the channel network structure and not to use the channel network extracted from DEMs. The objectives and the methodology must be stated clearly.

- The paper doesn't present the hydrological rainfall/runoff model used, neither the hydrological processes modelled. How Figures 3 and 7 were produced, what parts of rainfall contribute to runoff, and what is the spatial distribution of rainfall, soil, landuse and runoff?

- The application case is limited to only one catchment where rainfall/runoff are measured, and it is not clear how the methodology can be applied on ungauged basins in various hydro-climatic conditions. How to regionalize the model parameters: beta, celerity, diffusivity and others?

- A comparison between the new approach and existing approaches must be undertaken in order to show the novelty and the utility of the methodology.

Other comments:

- Page 11256, lines 1-10: Please give the characteristics of the rainfall/runoff events: spatial distribution of rainfall, rainfall intensities, runoff coefficients, etc. Why not to use a large number of rainfall/runoff events and not to apply on various catchments?

- Page 11257, lines 1-5: How were chosen the values of the celerity and the diffusion coefficient?

- Page 11257, lines 10-18: A numerical criteria must be given for comparing observed and calculated hydrographs in order to justify the conclusion that "the WFIUH successfully reproduces the runoff hydrographs."

- Page 11257, line 21: "shows a realization".

- Page 11257, line 19: What geometric criteria were used to compare the channel network sinuosity?

- Page 11257, lines 19-24: Do references concern Figure 4 and not 3?

- Page 11257, lines 1-5 and Figure 5: Why only the bifurcation ratio R_b is discussed? How about the other ratios of Horton-Strahler laws (R_a and R_l) and other geomorpho-

metric descriptors?