

## ***Interactive comment on “Study on the effects of storm movement on rainfall-runoff modelling at the basin scale” by S. K. Sigarood and Q. Chen***

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Manuscript ID: hess-2016-371 Full title: Study on the effects of storm movement on rainfall-runoff modelling at the basin scale Authors: Shahram Khalighi Sigaroodi, Qi-uwen Chen\*

Referee 1 The manuscript presents a study on the effects of storm movement on rainfall-runoff modelling at the basin scale. The manuscript is generally well written with clear research goals and an appropriate structure to present the methods and results. Even though the goal of the research (precisely examine the effects of moving storms on hydrograph simulation) is extremely ambitious and the modeling results highly uncertain, I believe the authors are to be congratulated for focusing on an interesting topic and providing some critical answers on rainfall characteristics in ungauged basins. –We thank the referee for this favorable assessment of our manuscript. We

are very grateful for his/her time and constructive comments on our manuscript. We have carefully considered all the comments and revised substantially the manuscript in accordance.

Some comments for this work are: 1. Line97-100, 'the hourly rainfall was obtained by multiplying the estimated total daily rainfall by the ratio of hourly rainfall to the daily rainfall'. How was this ratio calculated? Was it the mean ratio value of 3 gauges? How to make sure this ratio is appropriate for a certain daily rain gauge? –Thanks indeed for your important question, which helps us to present the work more clearly. The sentence was replaced by explanations in three steps. Please refer to line 100 -107.

2. More information should be presented on the concept of 'Time of Gravity Centre of Hyetograph'. How was it calculated and why it is important for determine the movement of cloud? – We are very grateful to this valuable comment, which improves the paper readability. More details and equation were added to the revised manuscript. Please refer to line 110 to 129.

3. Is a linear equation appropriate for describing the TGCH plane? Is there any assumption made? (is the cloud pattern treated unchanged during the movement?) if so, the assumption should be explained in detail. –Thanks indeed for this critical comment! Of course when cloud moves over a basin, the rainfall time at a point depends on the point location and cloud speed and direction. Although more stations could improve the accuracy, at least 3 gauges are necessary to record the rainfall to determine the occurrence time at a point. We added this explanation to the manuscript. Please refer to line 119 -122.

4. The calibration and validation of HEC-HMS model should be included. – Thanks for your great suggestions. More explanations and two tables were added to the revised manuscript about the calibration and validation of HEC-HMS model. Please refer to line 146-154 and new Tables 1 and 2.

5. The criteria for storm selection should be explained. What is 'typical storm events'?

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Why only 7 storms were selected? –Thanks indeed for this essential point. Actually the phrase “typical storm event” refers to storm recording. For this study, we needed storms data that recorded in all three gauges around the area and also their runoff hydrograph records in hydrological stations. It means that among all storm events, those which were recorded in all stations were used. Hence to avoid misunderstanding the sentences was amended. Please refer to lines 78-80.

6. More explicit conclusions of this research should be presented in the manuscript. –Thanks indeed for this important and critical comment. It is essential to scientific publication. The most important value of the paper was explicitly added into the Discussion. Please refer to line 197 - 200.

7. The figures are hard to understand, necessary explanations should be included. –Thanks indeed for your valuable comment. More explanations were added to the manuscript for figures 4, 5 and 10. Please refer to lines 99-105, 117-121 and 180-181.

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