Hydrology and Earth System Sciences Discussions

Interactive comment on "Multiplicative cascade models for fine spatial downscaling of rainfall: parameterization with rain gauge data" *by* D. E. Rupp et al.

Anonymous Referee #2

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1. This paper tries to suggest a simpler way to estimate the parameters of Multiplicative Cascade Model using conventional set of rain gauges rather than high resolution radar observation. The most advantage of MRC model is to reproduce the geometric spatial rainfall distribution using statistical model by preserving statistical characteristics at each cascade level. In addition to that, if self-similarity or fractal feature of rainfield can be used, the downscaling process can be carried out more numerically efficient(parsimonious) fashion. The self-similarity parameter is usually derived from the high resolution radar observation and it has proven to be exponentially inverse proportional to the large-scale forcing, which consists of core algorithm of MRC model.

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The process mentioned above can be achieved partially by using the observation from gauge network, but it has to be very densely distributed which can be hardly found in actual rain fields. Recently hydrometeorologic radar observation is becoming widely established, so the needs and objectives for this kind of research should be justified with more convincing way.

2. In addition the most shortcoming of the MRC is its blocky-shaped artifacts shown in rain band images. The studies for MRC model should show the trials for improving this problem. One of good examples is the spatial reconstruction filter or digital Gaussian filter.

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