Hydrol. Earth Syst. Sci. Discuss., 5, S1015–S1016, 2008
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Hydrology and Earth System Sciences Discussions

Interactive comment on "Cost-effective raingauge deployment and rainfall heterogeneity effect on hydrograph simulation in mountainous watersheds" *by* Jr-Chuan Huang et al.

Anonymous Referee #2

Received and published: 27 August 2008

This paper investigates the minimal number of rain gauges necessary to still describe the spatial rainfall pattern sufficiently accurately for discharge modelling. Next to the fact that the paper needs a lot of grammatical corrections, I have some major concerns with respect to this paper:
- The whole analysis is only based on two extreme events (typhoons) and may therefore not be representative for common rainfall events
- The analysis uses Thiessen polygons to interpolate rainfall in a mountainous area, which is not optimal! Normally, one would expect an interpolation technique that accounts for elevation.

In order to make the paper publishable, the analysis should at least be expanded to cover more rainfall events and second, an analysis of rainfall intensity with topography should be made in order to verify the validity of the Thiessen interpolation. I would urge that a more extensive analysis would be provided (which not only focusses on extreme rainfall, but which also includes more regular rainfall fields).

Other comments include:
- bias is not defined by an RMSE but is given by the average error. However, at a number of places, the term bias is probably correctly used.
- the radar used should be discussed in section 2
- units of discharge (see page 2173, line 10) is not cm!
- it is not clear how spatial rainfall is implemented in the topmodel: please better comment
- in your experimental design you describe different classes of rain gauge numbers. This is expressed in number of points per total number of pixels: what pixels? Model pixels or radar pixels?
- better describe that you are running a twin experiment in order to answer to the objective of your investigation, and that it doesnt́ use the observed discharge
- since the whole analysis is only performed on two major storms (typhoons) in a mountainous area, the extrapolation to Mediterranean areas is probably exaggerated (see page 2182, lines 20-21)

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 2169, 2008.