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Hydrology and Earth System Sciences
Discussions

Interactive comment on "When does higher spatial resolution rainfall information improve streamflow simulation? An evaluation on 3620 flood events" *by* F. Lobligeois et al.

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The authors thank Dr Michael Smith for his positive and constructive comments on the manuscript. We agree with all the corrections he proposed. We respond to his questions and we explain how we will modify the text to account for his comments.

1. Line 9: I suggest that the authors define the acronym KGE so that reader doesn't have to refer to the table.

Reply: We will do that: "The Kling Gupta Efficiency (KGE) (Gupta et al., 2009)

measures. . ."

2. Figure 6, lower left panel. Should the values of I_L be near 1.0? The x axis shows values much greater than 1. For example, compare Figure 6 to the top panels in Figure 11, where I_L seems to vary between 0.5 and 1.50

Reply: You are definitely right. There was a mistake in Figure 6. We apologize for that and we will correct it. Please see the figure at the end of this response. We also added the storm movement index I_M as suggested by the other reviewer (Dr. Alberto Viglione). The details of the calculation can be seen in our response to his comments.

3. Table 3. Please check the formula for KGE. If I am not mistaken, I think the quantity needs to be subtracted from 1. (see Equations 9 and 10 in Gupta et al., 2009)

Reply: You are right. The formula in the Table 1 was wrong. We apologize for this mistake and we will correct it. Please see Table 1 with the corrected formula.

Figure caption

Figure 2: Cumulative distribution of flood durations, peak values, event-based amounts of precipitation, localization, spatial variability and storm movement indexes of precipitation fields for the 3620 observed events in the 181 selected catchments (values for the minimum, 0.25, 0.5, 0.75 percentiles and the maximum are indicated on the cumulative distributions).

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 12485, 2013.

Table 1: Evaluation criteria used in this study, where *r* is the Pearson correlation coefficient between the simulated and observed flow, β is the ratio between the mean simulated and mean observed flow, α is the ratio between the simulated and observed flow variance, Q_j^{sim} and Q_j^{obs} are, respectively, the simulated and observed discharge at the time step *j*, j_1 and j_2 the beginning and the end of the flood event, Q_p^{sim} and Q_p^{obs} the simulated and observed peak, flow amplitude, $t(Q_p^{sim})$ and $t(Q_p^{obs})$ the time to the simulated and observed peak flow amplitude, with t_{beg} and t_{end} the beginning and the end of the flood event.

Criteria	Formula	Range	Error is null when
Kling-Gupta efficiency	$KGE = 1 - \sqrt{(r-1)^2 + (\alpha-1)^2 + (\beta-1)^2}$	[-∞ ; 1]	KGE = 1
Peak flow error	$\Delta Q_p = \frac{\left\|Q_p^{sim} - Q_p^{obs}\right\|}{Q_p^{obs}}$	[0 ; +∞]	$\Delta Q_p = 0$
Time to peak error	$\Delta t_p = \frac{\left\|t\left(Q_p^{obs}\right) - t\left(Q_p^{sim}\right)\right\|}{t_{end} - t_{beg}}$	[0 ; +∞]	$\Delta t_p = 0$
Volume error	$\Delta V = \frac{\sum_{j=j_1}^{j_2}\left\|Q_j^{sim} - Q_j^{obs}\right\|}{\sum_{j=j_1}^{j_2} Q_j^{obs}}$	[0 ; +∞]	$\Delta V = 0$

Fig. 1.

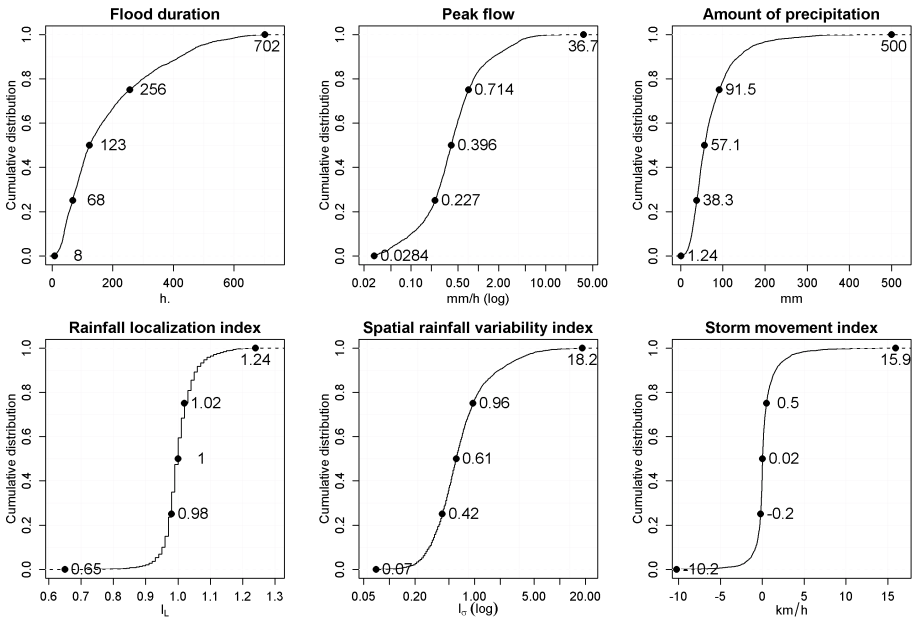

Fig. 2.