

Interactive comment on “Scale effects on runoff generation in meso-scale and large-scale sub-basins in the Luanhe River Basin” by P. Feng and J. Z. Li

Anonymous Referee #3

Received and published: 11 August 2008

The paper investigates the scale effects on runoff in different sub-basins belonging to the Luanhe river Basin which are characterized by different values of basin area; the topic is very interesting, the arguments are explained clearly, but the paper is scientifically poor. The analysis consists in the observation of runoff coefficients starting from observed precipitation and runoff data: the authors calculate the runoff coefficient of single event for 12 events occurring to six meso-scale and large-scale catchments, finding a reduction in average runoff coefficients with increasing basin area; the investigation of the reasons for reducing of runoff coefficient has often been done exploiting the outcomes obtained in previous studies, so this work is closer to a bibliographic review. The work needs more investigation of the processes involved, exploiting for

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



example hydrological models able to analyse the processes which affect the runoff production.

General comments

In my opinion the paper is incomplete; the analysis of the scale effects on runoff in different watersheds is an interesting issue, then it needs deeper investigations to provide a meaningful contribution to the state of the art and for the development of a physically-based hydrological models and parameter estimation on different scales. For example more attention should be dedicated to the analysis of different components of runoff generation (surface runoff, subsurface runoff and base flow): in the paper, I don't find distinction between the groundwater discharge and subsurface flow. The analysis should be made exploiting several rainfall-runoff events. In fact as reported in the abstract at line 9, "runoff coefficients varied widely from one rainstorm to the other", therefore 12/14 events and six basins analysed are poorly representative for this kind of analysis. Further analysis about the influence that the main physical factors play on the runoff generation are required; for instance it would be interesting to better investigate what may happen for different soil type or for different vegetation cover type.

Specific comments

Page 1516, line 4, the authors should explain the reason of the use of the "precipitation amounts in the preceding 7 days and initial flow" for the evaluation of the antecedent soil moisture: the choice is arbitrary or is indicated in literature? Page 1516 lines 10 to 14, the authors show as the antecedent soil moisture plays a fundamental role in runoff generation processes; in fact the runoff coefficient of the Laoniuhe basin (characterized by smaller amount of statistical preceding 7 - day precipitation) is lower than that of the Wuliehe basin and that of the Baohe basin which are characterized by larger drainage areas; so the analysed events may be strongly conditioned from the antecedent initial conditions (for instance, the high value of runoff coefficient of the Liuhe basin, reported

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



in table 2, may be conditioned to the high value of the Average 7 - day precipitation before the events computed for the same basin), therefore for a more objective evaluation, a larger number of events should be investigated. Page 1516, section 3.2, lines 22,23,24, is written that the spatial variability of soil properties was not considered because in the Luanhe river basin the flood was often caused by precipitation of long duration; but at page 1514, section 2.1, lines 9-10, is written that the rainstorms are characterized by short duration and high intensity. What is the correct sentence? Page 1519 section 3.2.4, it seems that the reason for the reduction of runoff coefficient for Luanhe basin is climate and soil type conditions, but connection between climate, soil type and basin area is not described; the goal of this work is to analyse the reasons for the runoff coefficients reduction with the increasing basin area as written in the introduction page 1513 line 25.

Technical comments

In the abstract, line 9, the word "wildly" should be "widely". Page 1513, the sentence at lines 10 - 11 should be better explained. Page 1518, section 3.2.2, lines 1-2, the sentence should be demonstrated through an example or a citation. Page 1518, section 3.2.2, lines 3-4 the sentence is not connected to the previous one. Page 1520, section 4, lines 24-25, which statistical analysis of the routing time, does the authors refer? Page 1525, the caption of table 3 should be: "the average rainfall coefficient"; Pages 1529 - 1530, it should be indicated the number or the name of basins in figures.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 1511, 2008.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper