

Research progress on the impact of ecological construction on the flood process

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Objectives

➤Vegetation change is one of the key factors that would alter the rainfall-runoff process by influencing the hydrological cycle processes and hydrological physical parameters.

➤ In order to minimize flood risks in river basins from the perspective of slope-river system, it is effective to fully excavate green infrastructure and thoroughly regulate its effect on water cycle.

➤The large-scale ecological construction can not only strengthen the impact of vegetation-soil ecosystem on the flood process, but also improve the ability of green infrastructure of the slope system on mitigating flood risks.

➤It is of great scientific significance and practical value to study the influence of ecological construction on the process of flood. Such research can facilitate better understanding on the basic characteristics and mechanism of ecological hydrological process, and further enrichment of the restoration theory of ecological hydrology, so as to support the practice of ecological restoration in Taihang Mountains and other regions in China.

Results

➤Research concluded that ecological construction can accelerate the change of vegetation conditions, soil conditions and topographic conditions that can influence hydrological processes, strengthening impact on flood elements and process.

➤It is manifested, from the mechanism of action, as runoff reduction in the rainfall infiltration stage and the lag effect of confluence stage on the slope confluence.

➤However, various complicated factors can influence the effect of vegetation peak clipping and flood detention, including type, structure and coverage of vegetation, the characteristics of regional rainstorm and flood, the size of the study basin, and the early soil moisture content.

➤The method to evaluate the flood regulation capacity of ecological construction is still limited.

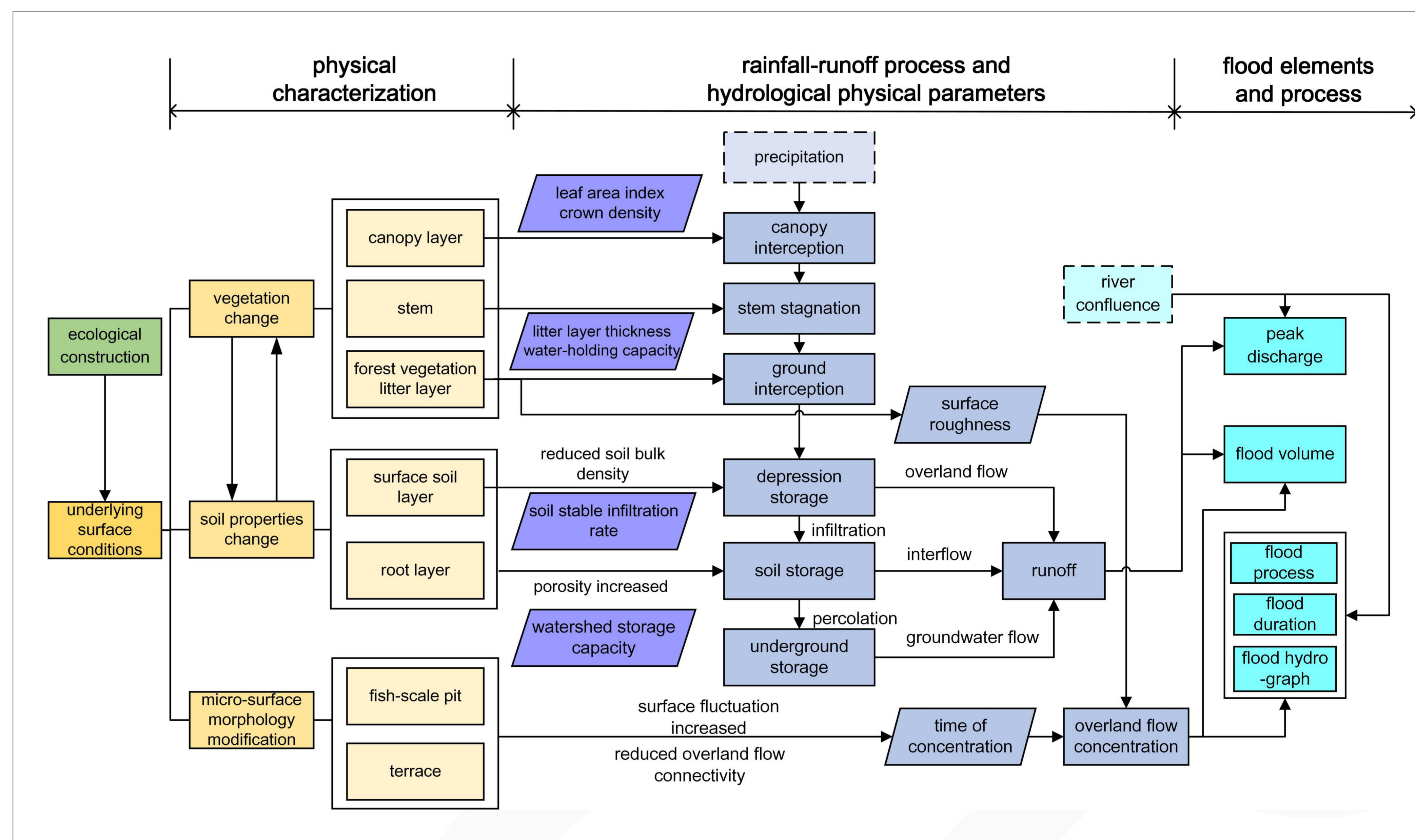


Figure1 Action process of ecological construction on flood runoff
Note : Enhanced processes or parameters are inside the parallelogram frame.

Methods

This study analyzed the action process of ecological construction on the key elements of flood formation from the perspective of eco-hydrological action mechanism, Then, researchers used the methods of hydrological response to land use / land cover change to summarize the current basic understanding of vegetation flood regulation.

Conclusions

Based on these findings, the paper identified the following areas where further researches can be conducted: the impact of vegetation-soil ecosystems on extreme hydrological processes; the impact of land use changes on floods from the perspective of vegetation scale, composition and layout; and the ability and regulatory potential of slope green infrastructure to regulate floods.