Response to Reviewer 1 Comments(water-989098)

Comments on manuscript "Study on Landscape Patches Influencing Hillslope Erosion Processes and Flow Hydrodynamics in The Loess Plateau of Western Shanxi Province, China"

In this study, the effects of patch combination type and quantity within the vegetation landscape on surface runoff and soil loss on the slopes of the Loess Plateau are evaluated. The study contains interested results which deserve to publish in Water. But a major revision of this manuscript is necessary.

Response: Thank you very much for your positive comments on our manuscript. We have addressed all of your comments in the revised manuscript. Also, English spelling has been reviewed in the new version. Please find below our specific responses to the individual comments.

Small points:

Please read and follow the instructions for authors and correct the manuscript in the acceptable form.

Response: Thank you very much for your suggestions. We carefully checked the guides and considered the wrong points to be improved.

In your manuscript you write "experimental site". Obviously, you mean experimental area. Please change it.

Response: Experimental site was changed by the experimental area in the new version of the manuscript.

2.1. Study area

The experimental area of the present study is located in the Cai Jiachuan Watershed, Ji County, Shanxi Province, China (110°39'45"–110°47' 45" E, 36°14'27"–36°18' 23" N). The study area falls within a warm temperate continental monsoon climate zone with an average annual temperature of 10.2 °C and average annual precipitation of 576 mm, with the majority of precipitation occurring from July to September, accounting for ~60% of annual rainfall. The main soil types in the study area are brown soil and loess parent material with a uniform soil texture [34]. The dominant land use types in the Cai Jiachuan Watershed include woodland, shrub, grassland, secondary forest, orchard, agricultural land and bare land. The watershed has diverse vegetation types with high species richness and diversity, with a vegetation coverage of ~65%. The main vegetation species include *Robinia pseudoacacia*, *Platycladus orientails*, *Pinus tabuliformis*, *Quercus liaotungensis*, *Lespedeza bicolor*, *Potentilla chinensis* and *Artemisia gmelinii* [32]. Figure 1 shows the geographic position of the study area.

The conclusions are very weak and must be improved.

Response: Thanks a lot for your manuscript. We reorganized the conclusion part

Two types of experiments were designed under the same vegetation coverage rate to determine whether vegetation patches can reduce runoff and sediment. The main hypothesis was to identify the effects of the type and number of vegetation patches on the hydrodynamic parameters of runoff and sediment. The results showed that the types and numbers of vegetation patches play a significant role in both runoff and sediment detachment. The combination of different vegetation patches showed a significant reduction in the runoff rates, sediment volumes, but an increase in surface roughness and a flow resistance. Also, we observed a reduction in hydraulic shear force and runoff power. Patch combinations of poorly connected vegetation landscapes registered stronger flow resistance and had a large impact on flow and sediment yield. Under a uniform distribution of vegetation patches, the runoff rate and sediment yield decreased significantly with an increased number of patches. Although the increase in the number of vegetation patches also resulted in a decrease in flow shear stress and stream power to different degrees, the differences between the combinations with similar patch numbers were not significant. The correlation between runoff and soil erosion considering in different patch types and vegetation coverages conformed to the power function relationship. The coefficient *a* of the power function represented the sensitivity of soil to be eroded. The sensitivity of soil to erosion decreased with an increasing number of vegetation patch types, while the sensitivities of patch combinations with poor connectivity were lower than those with good connectivity. We concluded that from this perspective, the optimization of vegetation in the Loess Plateau region, requires sufficient consideration to reducing the connectivity of vegetation patches and increasing the density of patches.

Figure 7 is not readable.

Response: Figure 7 was revised in the new version of the manuscript.