Comment form RC1 and the replies

To reviewer:

Thank you for your valuable comments on this work. Your feedback has helped us improve the clarity and accuracy of the manuscript. As an initial change, we updated Fig. 4 by replacing the panel with the final version and removing the capital letters to reduce distractions and improve readability. We provide point-by-point responses to all comments below.

Comment 1: Line 158: What are the capital letters in the figure 4(b)?

Replies: Thank you for pointing this out.

We agree that the meaning of the capital letters was not clarified in the original caption. The capital letters in Figure 4 label corresponding points in the plot and serve as common reference markers across panels (a–d). We have added the following clarification to the figure caption: “Capital letters denote corresponding points shared across panels (a–d).”

Before revision:

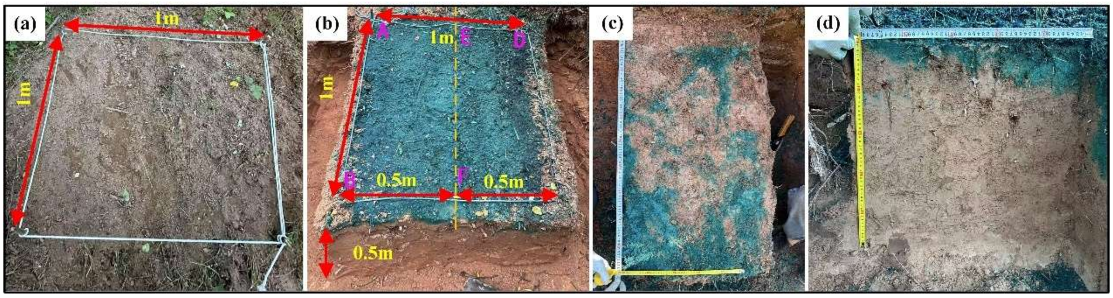

Figure 4. Dye tracer experiments and preferential flow pathways examination. (a) Experimental plot after vegetation removal. (b) Experimental plot after 24 h of brilliant blue solution spraying. (c) Horizontal dye-stained profile. (d) Transverse dye-stained profile.

After revision:

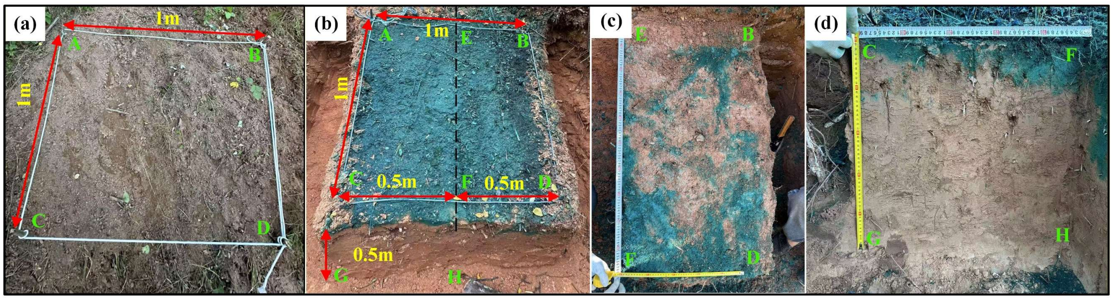

Figure 4. Dye tracer experiments and preferential flow pathways examination. (a) Experimental plot after vegetation removal. (b) Experimental plot after 24 h of brilliant blue solution spraying. (c) Dye-stained profile parallel to the slope surface. (d) Dye-stained profile along the gravity direction. Capital letters denote corresponding points shared across Fig. 4a–d.

Comment 2: Lines 135-136: Indicate the slope gradients for which dye tracer experiments were conducted for woodland and shrubland, respectively.

Replies: Done.

Revised as suggested. We have added the slope angles of the dye tracer experiment sites in Lines 135-136: 36° for the woodland site and 38° for the shrubland site.

Before revision:

Dye tracer experiments were conducted on vegetated slopes near the soil moisture monitoring sites to examine the preferential flow pathways (Fig. 1d). An electric sprayer was used to spray a 4 $g \cdot L^{-1}$ brilliant blue solution onto a 100 cm × 100 cm plot (Figs. 4a and 4b)

After revision:

Dye tracer experiments were conducted on vegetated slopes near the soil moisture monitoring sites to examine the preferential flow pathways (Fig. 1d). The slope angles were 35.8° at the woodland site and 38.2° at the shrubland site. An electric sprayer was used to spray a 4 $g \cdot L^{-1}$ brilliant blue solution onto a 100 cm × 100 cm plot (Figs. 4a and 4b).

Comment 3: Line 208: Provide evidence supporting the claim that the landslide point density in woodland is about 50% lower than in shrubland under similar conditions.

Replies: Done.

This statement was intended to be supported by the statistical results presented in Fig. 5a. To avoid ambiguity, we have revised the text to explicitly cite the evidence and removed the "about 50%" wording.

Before revision:

The *A–S* relationship shows that, at similar slope gradients, landslides in woodland require larger upslope contributing areas than those in shrubland. This suggests that, compared with landslides in shrubland, those in woodland may require higher rainfall-intensity thresholds, steeper slopes, or both, for initiation. As a result, landslide point density in woodland is about 50% lower than in shrubland under similar conditions.

After revision:

The *A–S* relationship shows that, at similar slope gradients, landslides in woodland require larger upslope contributing areas than those in shrubland. This suggests that, compared with landslides in shrubland, those in woodland may require higher rainfall-intensity thresholds, steeper slopes, or both, for initiation. Consistent with this, shrubland shows a higher landslide point density than woodland (1.56 times; Fig. 5a).

Comment 4: Line 283: Replace S-50 with S-85 in Figure 9(b).

Replies: Done.

In Fig. 9(b), the label has been corrected from "S-50" to "S-85".

Before revision:

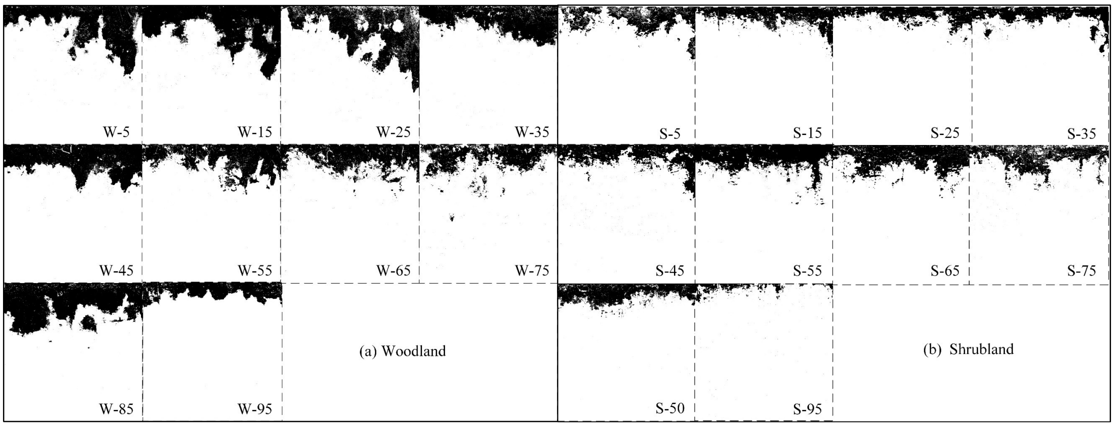

Figure 9. Schematic dye-stained vertical soil profiles at different hillslope positions. (a) Woodland profile; (b) Shrubland profile. Numbers from 0 to 100 denote relative slope positions, with lower values indicating locations near the slope base.

After revision:

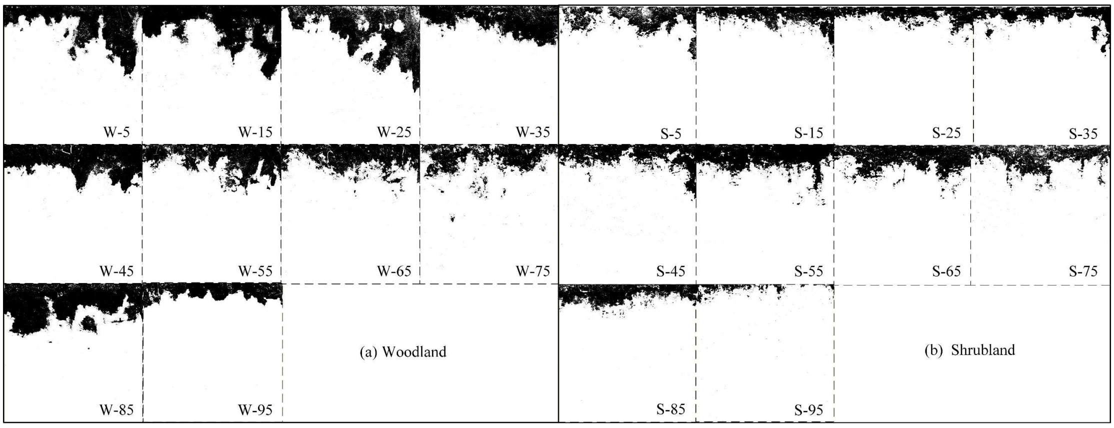

Figure 9. Schematic dye-stained vertical soil profiles at different hillslope positions. (a) Woodland profile; (b) Shrubland profile. Numbers from 0 to 100 denote relative slope positions, with lower values indicating locations near the slope base.

Comment 5: Lines 323-324: I suspect that the tensile strength varies significantly depending on tree species. Could it be due to differences in the tensile strength possessed by constituent species, rather than differences between woodland and shrubland?

Replies:

We acknowledge that tensile strength can vary among woody species. Accordingly, our interpretation is explicitly confined to the monospecific stands dominated by *Robinia pseudoacacia* (woodland) and *Rosa xanthina* (shrubland) investigated in this study, rather than being generalized to all woodland and shrubland types.

The woodland–shrubland comparison was conducted using pure stands dominated by a single species, rather than in mixed communities. The sampling plots were established within a pure *Robinia pseudoacacia* woodland and a pure *Rosa xanthina* shrubland, with no other woody species present, which reduced the potential for confounding effects from multi-species composition on strength-related parameters. In addition, the two sites were adjacent and located within the same catchment, with comparable background soil conditions, helping to minimize non-vegetation influences on root–soil composite properties.

To avoid ambiguity due to unclear phrasing, we have added site information to the Methods, Results, and Conclusions sections. These additions clarify that each study site is dominated by a single woody species (woodland: *Robinia pseudoacacia*; shrubland: *Rosa xanthina*).

Before revision:

In the study area, the woodland has an open structure due to sparse to moderate tree density and high canopy height (Fig. 3a), whereas the shrubland has a closed structure because of high density and low canopy height (Fig. 3b). Both land types have a well-developed herbaceous layer.

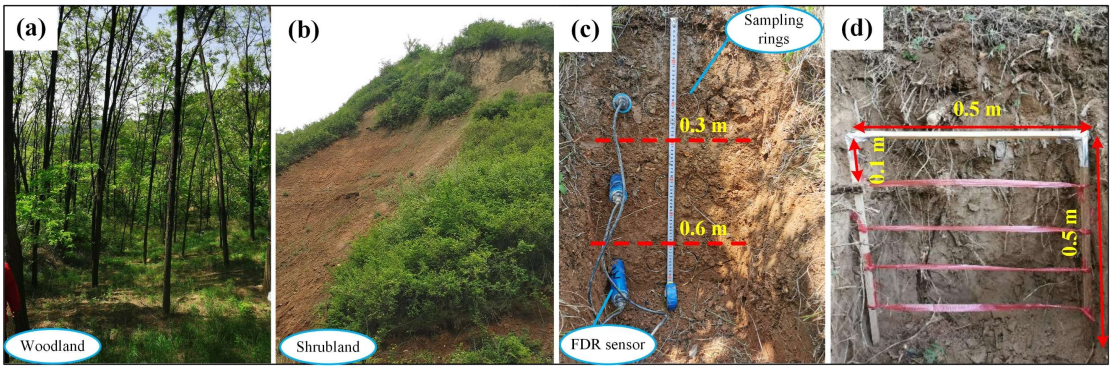

Figure 3. Soil moisture monitoring and soil and root sampling. (a) Open woodland dominated by *Robinia pseudoacacia*. (b) Close-structure shrubland dominated by *Rosa xanthina*. (c) Trench wall showing soil sampling and FDR sensor installation. (d) In situ root counting and sampling at 0.1 m depth intervals.

After revision:

In the study area, the woodland has an open structure due to sparse to moderate tree density and high canopy height (Fig. 3a), whereas the shrubland has a closed structure because of high density and low canopy height (Fig. 3b). Each study site is dominated by a single woody species, with *Robinia pseudoacacia* in the woodland and *Rosa xanthina* in the shrubland. Both land types have a well-developed herbaceous layer.

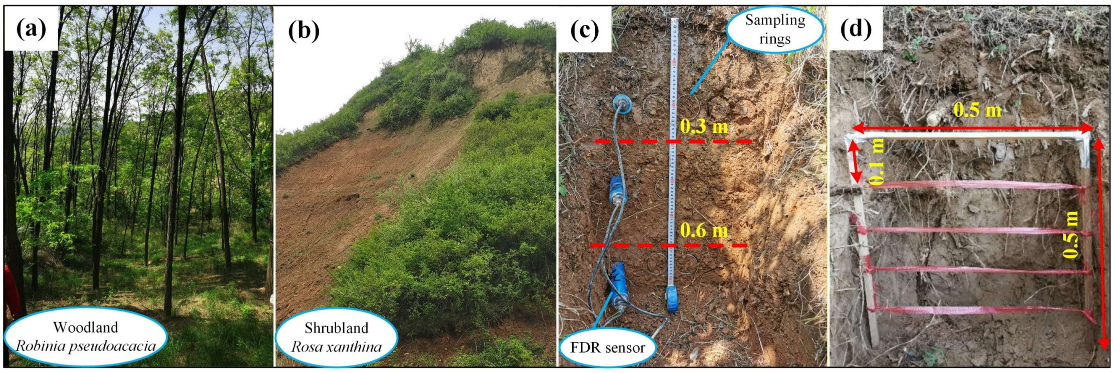

Figure 3. Soil moisture monitoring and soil and root sampling. (a) Open woodland dominated by *Robinia pseudoacacia*. (b) Close-structure shrubland dominated by *Rosa*

xanthina. (c) Trench wall showing soil sampling and FDR sensor installation. (d) In situ root counting and sampling at 0.1 m depth intervals.

Before revision:

Root spatial distribution and mechanical properties differ markedly between woodland and shrubland soils (Figs. 11a, 11b, and 11c). Field measurements indicate that maximum rooting depths in woodland and shrubland are close to their respective mean landslide depths, at 0.84 m in woodland and 0.54 m in shrubland. This consistency indicates a close relationship between root distribution and landslide depth. Compared with shrubland, roots in woodland mobilize greater root cohesion at a given root diameter and exhibit a larger specific root area. These roots therefore create a more extensive root-soil contact interface and form a mechanically stronger root-soil composite.

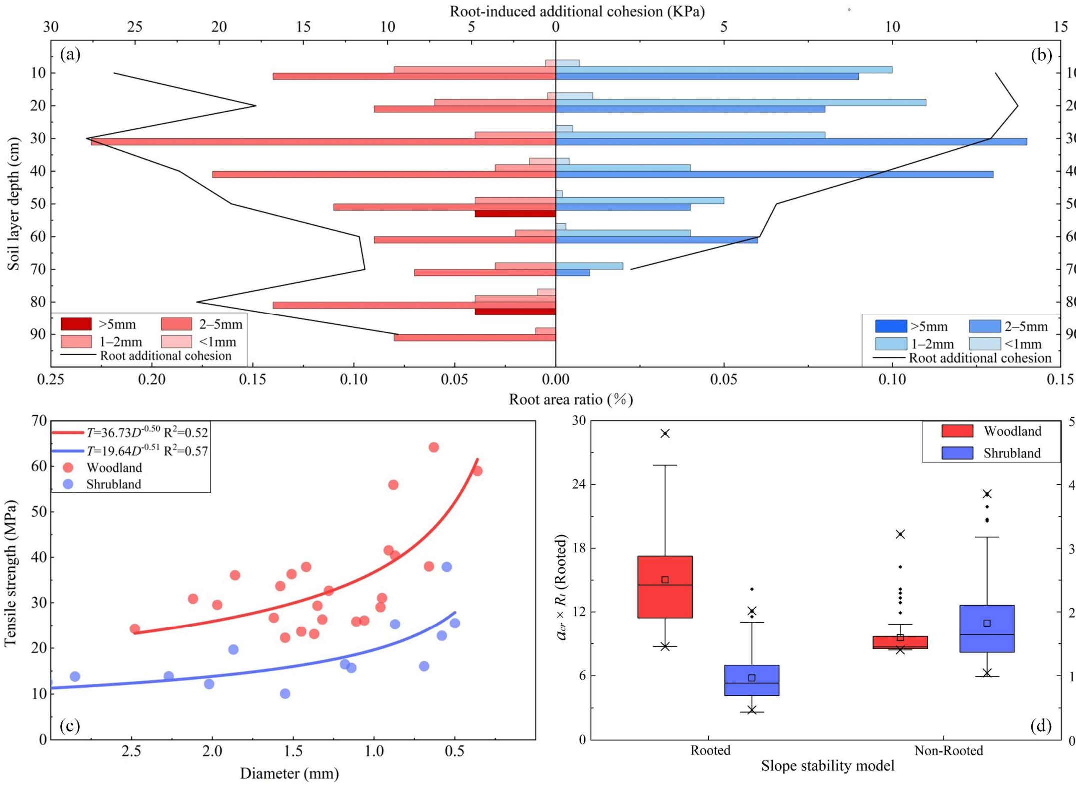

Figure 11. Mechanical indices of slope stability in woodland and shrubland. **(a)** Root area ratio and root-induced cohesion in woodland; **(b)** Root area ratio and root-induced cohesion in shrubland; **(c)** Relationship between root tensile strength and diameter; **(d)** Slope-stability models for woodland and shrubland. The definitions of the whiskers are given in the caption of Fig. 5.

After revision:

Root spatial distribution and mechanical properties differ markedly between woodland and shrubland soils (Figs. 11a, 11b, and 11c). Field measurements indicate that maximum rooting depths in *Robinia pseudoacacia* and *Rosa xanthina* are close to their respective mean landslide depths, at 0.84 m in *Robinia pseudoacacia* and 0.54 m in *Rosa xanthina*. This consistency indicates a close relationship between root distribution and landslide depth. Compared with *Rosa xanthina*, roots in *Robinia pseudoacacia* mobilize greater root additional cohesion at a given root diameter and exhibit a larger specific root area ratio (RAR). These roots therefore create a more extensive root-soil contact interface and form a mechanically stronger root-soil composite.

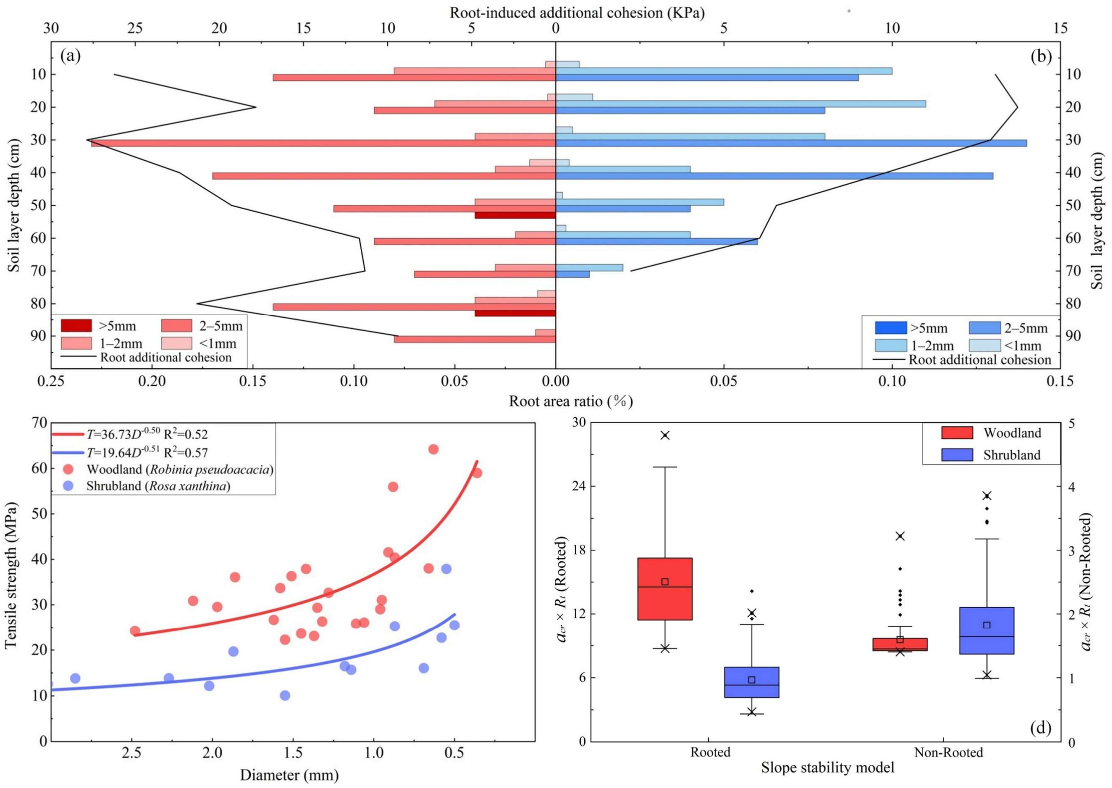

Figure 11. Mechanical indices of slope stability in woodland and shrubland. (a) Root area ratio and root-induced cohesion in woodland (*Robinia pseudoacacia*); (b) Root area ratio and root-induced cohesion in shrubland (*Rosa xanthina*); (c) Relationship between root tensile strength and diameter; (d) Slope-stability models for woodland and shrubland. The definitions of the whiskers are given in the caption of Fig. 5.

Before revision:

In this work, we addressed the landslide initiation in woodland and shrublandby landslide spatial patterns, hydrological response, and slope failure resistance.

After revision:

In this work, we addressed the landslide initiation in woodland (*Robinia pseudoacacia*–dominated) and shrubland (*Rosa xanthina*–dominated) by landslide spatial patterns, hydrological response, and slope failure resistance.

Comment 6: Lines 387-388: These descriptions appear to differ from the results in Figure 11(a) and Figure11(b).

Replies: Thank you for pointing this out.

Upon checking, we found that the statement in Lines 387–388 (Conclusion 3) did not fully align with the results shown in Figs. 11a and 11b. We have revised Conclusion 3 accordingly based on the results in Figs. 11a and 11b.

Before revision:

Woodland roots concentrated at 10–25 cm provides greater root cohesion, greater slope failure resistance, and higher slope stability than shrubland roots confined to 0–10 cm depth. Therefore, the sediment production from landslide erosion in Chinese Loess Plateau may differ in various forest types, which deserves further study in future.

After revision:

Woodland roots extend deeper and span a wider depth range than shrubland roots. Within the same depth interval, root additional cohesion and *RAR* are also higher than those in shrubland. These patterns indicate stronger root-network reinforcement in woodland soils and lower susceptibility to shallow landslides than in shrubland. Therefore, the sediment production from landslide erosion may differ in various forest types, which has been rarely addressed and deserves further study in future.