# Mosaic desert pavement influences water infiltration and vegetation distribution on fluvial fan surfaces

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## Abstract

Desert pavements are critical for maintaining ecological stability and promoting near-surface hydrological cycle in arid regions. However, few studies have reported the desert pavements on ecological on fluvial fans. Although desert pavement surfaces appear to be barren and flat, we found that the surfaces were featured by mosaic pattern of desert pavement (DP) and bare ground (BG). In this study, we investigated the effects of mosaic DP on water infiltration and vegetation distribution at six sites (i.e. one on the hillside and five in the sectors of fluvial fans) along a southwest belt transect on the fluvial fans in the Northern Linze County, in the middle of Hexi Corridor. The results showed that significant differences of Mosaic DP between hillside and sectors of fans were found in pavement thickness, thickness of vesicular horizon (Av thickness), particle composition and bulk density, rather than soil moisture content (SMC), gravel coverage and surface gravel size. The mosaic DP can inhibit water infiltration by pavement layer, where the sorptivity ($S$), initial infiltration rate ($i_{\text{int}}$) and steady- state infiltration rate ($i_{\text{sat}}$) and infiltration time ($T$) averaged 1.30 cm/min-0.5, 5.03 cm/min, 0.23 cm/min, and 12.76 min respectively. If pavement layer was scalped, the $S$, $i_{\text{int}}$ and $i_{\text{sat}}$ increased by 0.75 cm/min-0.5, 2.90 cm/min and 0.13 cm/min, respectively, and the $T$ was shortened by 5.34 min. Water infiltration was mainly controlled by the pavement layer thickness (+), Av thickness (-), surface gravel coverage (-), and fine earth (+) and fine gravel (-) of pavement layer. Mosaic DP grew less shrubs than mosaic BG where distributed plenty of herbs. It can be concluded that desert pavements can keep vegetation stability by self-regulating rainfall. This study would deepen our understanding of the eco-hydrological cycle of pavement landscape in arid regions.

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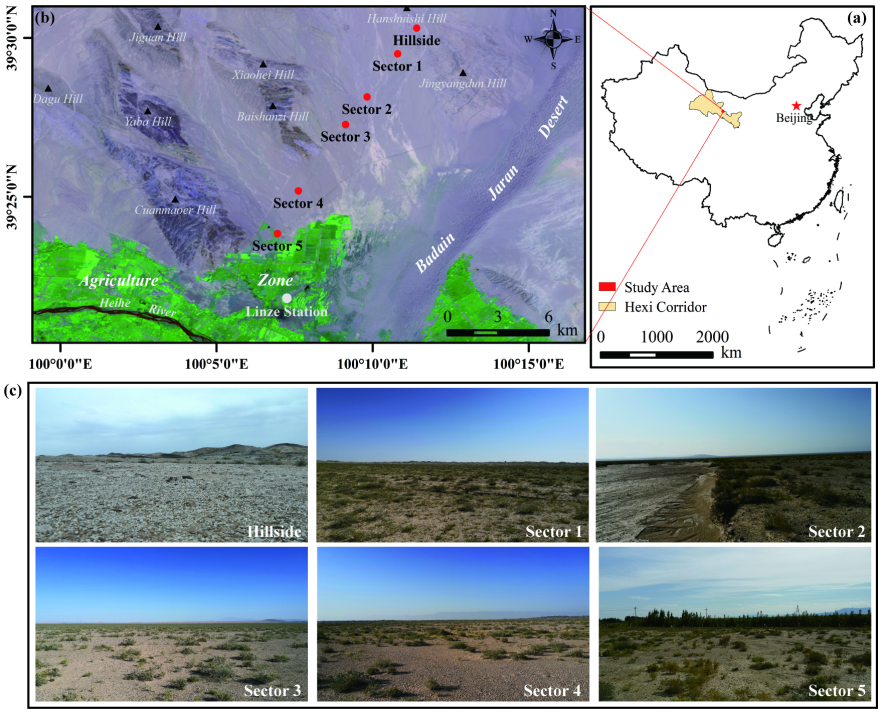


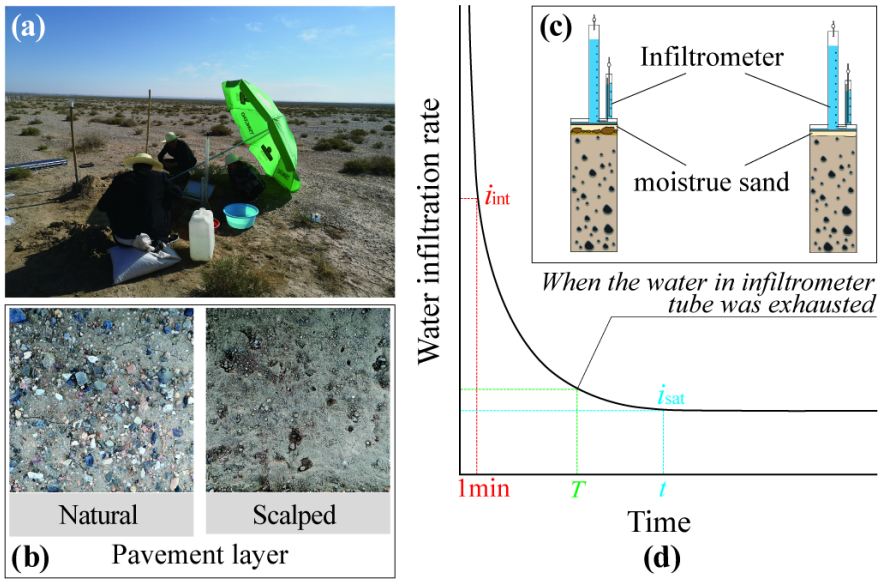

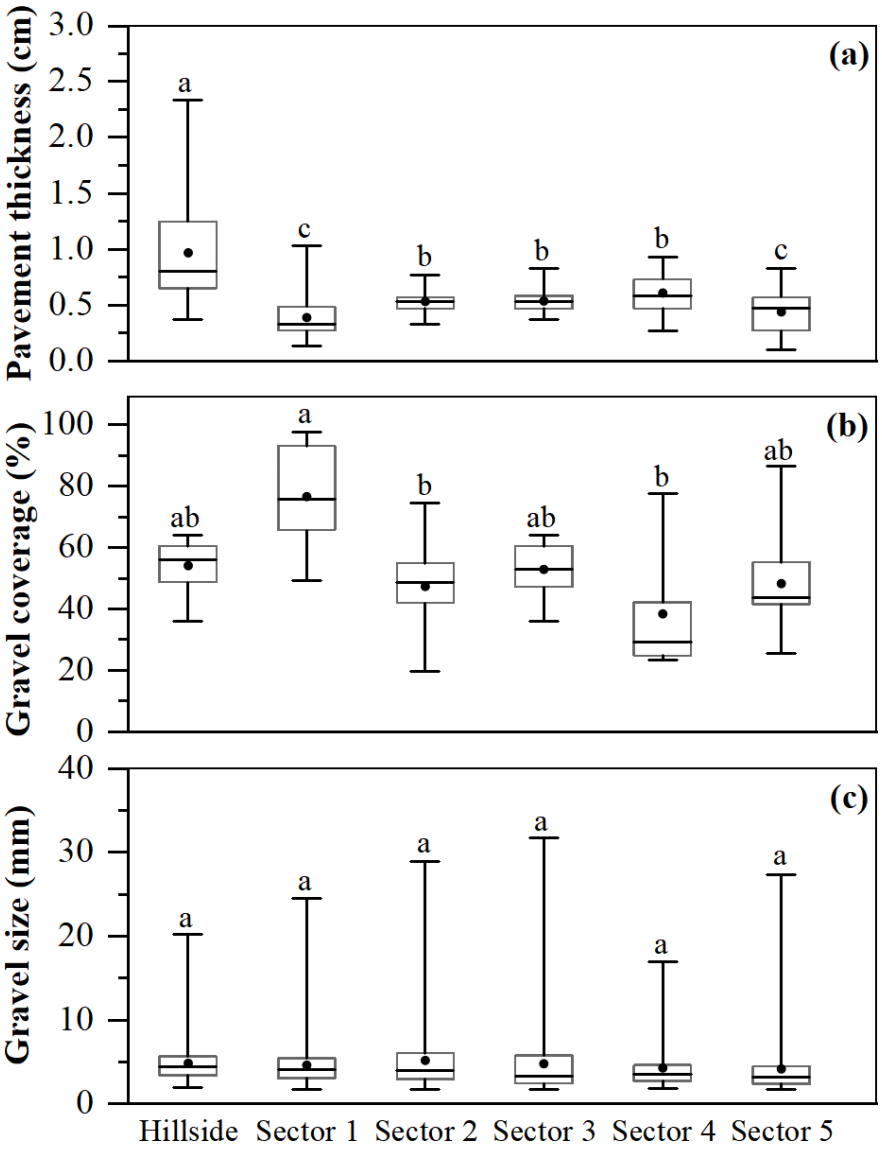


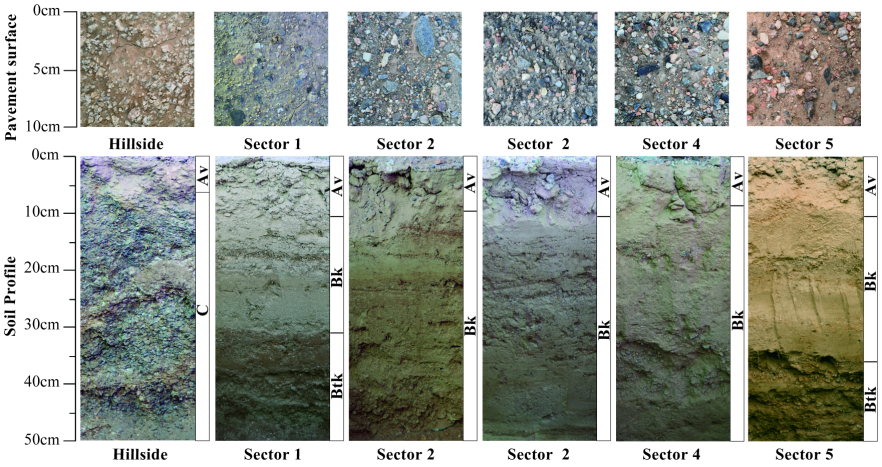

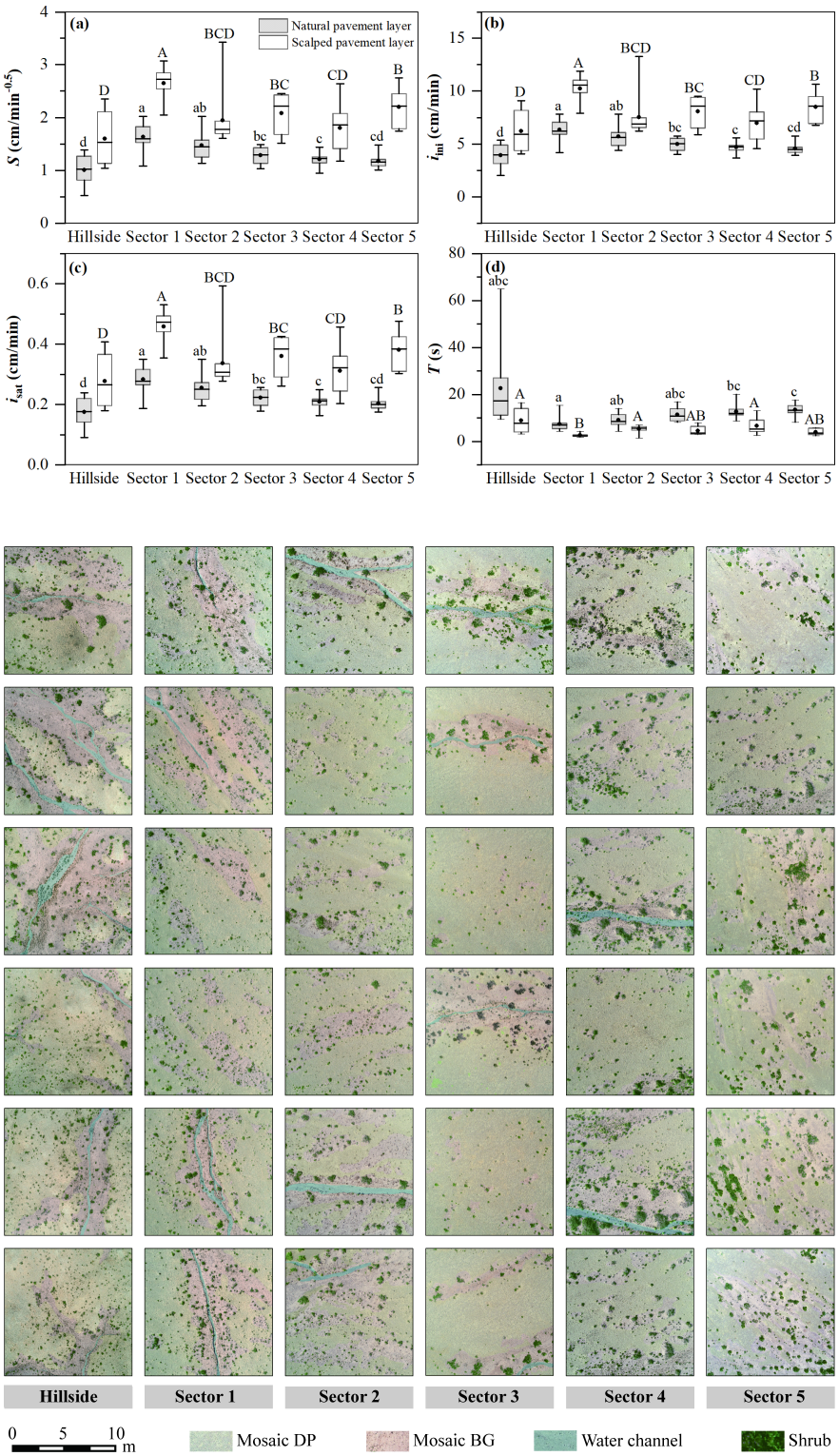


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