



The influence of biological soil crusts on successional vegetation patterns in a revegetated desert area in the Tengger Desert, China

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Biological soil crusts (BSCs) are an important cover in arid desert landscapes, and have a profound effect on the soil water redistribution, plant growth and vegetation succession. Although a large number of studies have focused on the single-process of BSCs experimentally, relatively few studies have examined the eco-hydrological mechanisms of BSCs influence on successional vegetation patterns in revegetated desert areas. In this study, based on the long term monitoring and focused research on sand-binding vegetation in the Shapotou region (southeastern edge of the Tengger Desert, China) since the 1950s, the characteristics of plant community and BSCs at different successional stages, and the soil water dynamics were investigated. Then a simplified mathematical model describing the coupled dynamics of soil moisture and vegetation in drylands was developed. And finally the role of BSCs on soil water dynamics and vegetation patterns were discussed. Results have showed that BSCs was closely associated with the vegetation succession, such as in the *Caragana korshinskii* community, moss crusts were the dominate species and in the *Artemisia ordosica* community, algae crusts were the dominate species. BSCs had a significant effect on soil water infiltration and it was one of the main driving forces to vegetation pattern formations, as algae crusts would induced the tiger bush stripes and moss crusts would lead to the leopard bush spots in arid ecosystems.