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### 坡面水流速度与坡面含砂量的关系

#### Relationship between the spatial distribution of flow velocity and sediment concentration

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英文关键词: [flow velocity](#) [experiments](#) [rain](#) [rill erosion](#) [sediment concentration](#)

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#### 中文摘要:

通过组合不同坡度(10°、15°、20°、25°)、不同坡长(5、10 m)、不同雨强(1.5、2 mm/min)的室内纯净水模拟降雨试验,对坡面细沟侵蚀发生过程中的坡面流速的沿坡变化进行了研究,并讨论了流速与坡面含沙量的关系。试验结果显示:从坡顶至坡脚,坡面细沟流的速度逐渐增加;坡面流速主要受雨强和其流动距离影响,与坡度无关,并得到流速与雨强和距坡顶距离的关系式。坡面含沙量与坡度、雨强和坡面流速相关,而10 m坡长所测的含沙量与5 m坡长相近。将坡面流的能量分配为自身流动所需能量、剥蚀土壤消耗能量以及携带搬运土壤所需能量,在一定坡长内,径流的能量足以剥蚀并携带搬运坡面土壤,但超过此范围,虽然流动速度在增加,但是径流消耗于携带搬运泥沙的能量也增加,从而使坡面流的能量不足以支撑剥蚀土壤耗能,而坡面含沙量不会有显著的增加。

#### 英文摘要:

Though conducting rain simulation experiments which used deionized water under different slopes (10°, 15°, 20°, 25°), different slope lengths (5, 10 m) and different rainfall intensities (90 mm/h, 120 mm/h), the distribution of flow velocity and the relationship between it and sediment concentration were discussed. From the top of the slope to the foot, the flow velocity gradually increased; and it was mainly affected by rainfall intensity and the distance it flew, while it was independent of slope, a simple equation was obtained. Relationship between velocity and rainfall intensity and the distance from the top was acquired. The results showed that sediment concentration was dependent of gradient slope, rainfall intensity and flow velocity, however sediment concentration measured of the 10 m slope was similar to that of 5 m slope. The energy of overland flow can be divided into three parts: the energy needed for its own mobile, the energy consumption of soil erosion and the energy needed to bring the soil particles. Within certain slope lengths, the energy of flow was enough for soil erosion and transport. Beyond this distance, although velocity of flow increased, the removal of sediment would consume more energy, so that there would not be more energy for the erosion of soil, thus sediment concentration didn't increase significantly.

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