

◆ Research Paper ◆

Study on the Phase Characteristics of the Collocation Relationship Between Runoff and Sediment in the Slop-Gully System

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Abstract: Slope-gully system is the basic unit to study the erosion regularity and arrange the soil and water conservation measures. The study on the phase characteristics of the collocation relationship between runoff and sediment is very important for arranging soil and water conservation measures of adaptation to local condition. Based on the Key Laboratory of Yellow River Sediment Research of Ministry of Water Resources, the paper analyzed the process of runoff and sediment production in the slop-gully system of the soil erosion and the phase characteristics of the collocation relationship between runoff and sediment in the 3 different rainfall intensities by using the artificial rainfall simulation test method. The results showed that:

(1) Under the condition of a certain underlying surface, there is a critical point in the process of soil erosion in the slope-gully system. Less than the certain rainfall intensity, the runoff and sediment yield increased greatly with the increasing rainfall intensity. Over the certain rainfall intensity, the increasing degree of runoff and sediment yield and the velocity of erosion evolution slowed down.

(2) The rainfall intensity and rainfall are important factors for affecting the process of erosion and sediment yield. And the effect of rainfall intensity on runoff and sediment yield is even greater than the rainfall.

(3) The collocation relationship between the runoff and sediment in the slop-gully system of the quasi shallow gully erosion stage was significantly different from that of sheet erosion stage and rill erosion stage. And with the same runoff yield, sediment yield increased significantly. Therefore, the soil and water conservation measures should be arranged according to the erosion development stage and the rainfall characteristics.

Key words: slop-gully system, runoff and sediment yield, the collocation relationship between the runoff and sediment, phase characteristics