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Runoff process in the Miyake-jima Island after Eruption in 2000

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Hydrological environment in a basin can be changed completely due to volcanic eruption. Huge volume of tephra was yielded due to eruptions in 2000 in the Miyake-jima Island, Japan. Hydrological monitoring was conducted at four observation sites with several hundred m2 in a basin. Those were decided by the distribution of thickness and the grain size of the tephra. Rainfall intensity was measured by a tipping bucket type raingauge and flow discharge was calculated by the over flow depth in a flow gauging weir in the monitoring. However, the runoff rate did not relate to the grain size of tephra and the thickness of tephra deposition, according to measured data of rainfall intensity and runoff discharge.
Supposing that if total runoff in one rainfall event is equal to the summation of rainfall over a threshold, the value of the threshold must be the loss rainfall intensity, the value of the threshold corresponds to the infiltration for the rainfall intensity. The relationships between loss rainfall intensity and the antecedent precipitation are calculated using measured rainfall and runoff data in every rainfall event, focusing on that the antecedent precipitation before occurrence of surface runoff approximately corresponds to the water contents under the slope surface.
In present study, the results obtained through data analyses are summarized as follows:
(1) There are some values for the threshold values, and the loss rainfall intensity approaches to some constant value if the value of the antecedent precipitation increases. The constant value corresponds to the saturated infiltration.
(2) The loss rainfall intensity must be vertical unsaturated infiltration, and observed data for water runoff can express that the runoff is given by the excess rainfall intensity more than the loss rainfall intensity.
(3) There are two antecedent times for rainfall with several hours and several days, and the saturation ratio before antecedent time at four observation sites can be predicted in the range from sixty to ninety percentages by the water retention curve.