

An attempt for damage risk evaluation based on arrival distances of debris flows in the 1983 Sanin heavy rainfall disaster

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Arrival distance of debris flows along streams depends on river profile and conditions of sediments and bottom in addition to water discharge. Numerous debris flows occurred due to heavy rainfall in mountainous area of western Shimane, Japan at 1983. To obtain the characteristics of arrival distances from the source points around Mt. Oasayama, western Shimane, perspective angle, which is coincide with the angle of equivalent coefficient of friction have been measured based on air photos taken just after the disaster of 1983.

Frequency of perspective angle ranges 15 to 18 degrees in some catchments areas, and this is a somewhat larger than that obtained in Southern Kyushu, Japan. Whereas mountainous slopes are mainly composed of quartz diorites with schistose rocks, fluvial sediments are distributed in the narrow downstream area. Some river profile indicates, therefore, a remarkable contrast between steep in upstream portion and gentle in downstream. Applying the general tendency of perspective angle to these river profiles, it becomes possible to obtain arrival distance of debris flows. Most of them are in 300 to 400m in this area.

In general, the products of probabilities of natural hazard and vulnerability in there, gives damage risk due to the natural hazard in future. Using the probability of arrival distance of debris flow as the former, and the probability of distribution of houses as the latter, it becomes possible to calculate damage risk curves along river course. Some types are recognized in them. One is uniform decreasing toward downstream, and another is a type of a peak at any distance. Based on these curves along some typical river, we can evaluate the amount of damage risk and its changes along it.