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The Role of Plan Form of Valley-Ravine Net in the Process of Mud Flow Formation

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Abstract

Seventy-five percent of all mudflow events in Armenia occur at 1800–2000 m heights. The reasons responsible for this are identified to be: 1) the large surfaces of those heights, 2) the centralisation of flow on those heights 3) the essential impact of anthropogenic factor over those heights. The mudflow formation is influenced by: 1) Local topographical particularities, 2) Geological-geomorphologic state, 3) Hydro meteorological conditions, 4) Soil-vegetation cover features, and 5) Human impact.

Republic of Armenia is a mountainous country, where on 30 000 km² the height difference constitutes 3700 m. The horizontal ruggedness over 70 % of country surface is 1–1.6 km/km² and more. The amount of talvegs range between 30–50 on 1 km².

The role of plan form of valley-ravine net in the process of mudflow formation is very decisive. For mudflow to form, a mountain relief is necessary. For the centralization of mudflow it is essential to have certain relief conditions and a plan form of valley-ravine net. There is very close relation between the form of mudflow watershed (K), the perimeter (C) and the line connecting mouth and spring (start) (D):

$$K = C/D$$

Our investigations have shown that mudflow watersheds with fan-shaped net usually have K (form coefficient) more than 2.8. In the case of plumose-type valley, net K is no greater than 2.5. In the case of transition or mixture nets, K value is ranging between 2.5–2.8.

The mudflow bed profile is another important mudflow-forming component in the case when other components have the same meaning. For the mudflow formation, the worst situation was identified to exist in southern and southern prone slopes, which are characterized with insufficient humidity, big thermal differences, scarce vegetation cover. Also, the hard component emerges here most easily. In northern aspects, mudflow events are rare due to forest, meadow and other intensive vegetation cover.

Keywords: Fan-shade net, mudflow, plan form of valley-ravine net, plumose-type net