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A Possible Triggering Mechanism for Debris Flow initiation

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A possible triggering mechanism for debris flow initiation was studied. Debris flow after landslides disaster caused a lot of casualty in many places. Landslides during rainstorm season or caused by earthquake impact create large quantity of piled deposits. Debris flow disaster could happen in afterward rainstorm season. When flow quantity in an alluvial channel in the rising stage, increasing of flow depth and velocity exert larger shearing force causes bed load material to move. Shield's theory gave clear description of this phenomenon. But, debris flow initiation is different from increasing of shearing-force, piled deposit or bed material moved in group would happen more easily from decreasing in its effective weight. In the real world, river bed formed by natural geomaterial normally is not a solid one but permeable. In the rising stage of flow, increase of flow depth and velocity cause pore water pressure(PWP) within bed material to increase, when the surge of flow passed, in the falling stage, PWP start to decline as a result of energy transmitted from surface flow decrease. The time needed to dissipate excess PWP is depends on the permeability of geomaterial and flow path. Normally PWP in shallow depth dropped faster than PWP in deeper zone. In the mean time an upward hydraulic gradient could developed and caused a decrease in effective stress for the whole piled material makes it became easily to be moved. This forms a possible form of triggering of debris flow. Field monitored data showed the reverse gradient did exist. Prewarning system can be planned on potential debris pile or river bed to monitor triggering of debris flow.