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A bibliographic reference work of debris-flow monitoring devices and methods

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Debris-flow monitoring has two useful functions, warning and modeling. Warning requires some parameters of the debris-flow, occurrence prediction and detection, proximity sensing, and discharge estimation. Models based on the parameters of the debris-flow obtained from the monitoring sensor can make the basis for creating a hazards map and designing various types of control structures to prevent or mitigate its hazards.

A comparison list of many devices and methods for debris-flow monitoring is shown in this presentation. They are divided four groups. The first one includes Euler group to measure debris-flow parameters at a stationary point in the field. The second group is Lagrange group to obtain the parameters by moving together with the debris-flow. The parameters are indirectly deduced by statistical analyses of the geographic and/or geological data or image processing of the remote sensing data. Such data are provided by Satellite sensor, GPS (Global Positioning System), or GIS (Geographic Information System). The forth group, field-survey group, acquires directly the parameters in the field. Some of them are in operational field use or in feasibility test.

Advanced studies may lead to a breakthrough in future developments of debris-flow monitoring. An example is an integrated sensing system combined with some devices and methods or an image-processing network of debris-flow video-images taken around the world.