

Can we use plants to prevent debris-flow hazards?

Laboratory experiments on the effects of vegetation on debris-flow erosion

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Project description

Debris flows are masses of soil, rock and water that rush down mountainsides and spill onto valley floors, where they can devastate people and property. The number of casualties and the amount of damage caused by a debris flow depends on its volume. Flow volume depends on how much sediment is eroded while flow traverses from mountainside to valley. Therefore, to minimize the hazardous impact of debris flows erosion needs to be minimized.

At present, debris-flow hazards are often mitigated by minimizing erosion through concrete structures such as check dams. However, bioengineering techniques, such as growing vegetation in the debris flow path, may also inhibit erosion. However, at present we lack understanding of how vegetation growth affects the erosion process, and to what extent it can limit debris-flow erosion.

For this Bright Minds Assistantship, the student will perform experiments in a large [debris-flow flume](#) in the Earth Science Simulation Lab (ESL), equipped with modern measurement devices such as load cells, geophones, and laser scanners. The student will develop and perform new experiments to study the effects of vegetation on bed erosion by debris flow. Furthermore, the student will help analyze the dataset and potentially help prepare a scientific publication.

We envision that this project will form the first steps in exploring the potential of bioengineering for debris-flow hazard mitigation, which we hope will evolve in the implementation of bioengineering approaches in real-life debris-flow torrents in the future.

Job requirements

Interest in natural hazards, landslides, and biogeomorphology. Willingness to perform laboratory experiments.