

NRP 61 : Sustainable Water Management

Effects of climate change on alpine flood runoff

Coordination
Dr. Felix Naef

Staff
Nina Volze
Maarten Smoorenburg
Dr. Eduard Hoehn
Prof. Dr. Wolfgang Kinzelbach
Prof. Dr. James Kirchner
Dr. Simon Scherrer
Dr. Petra Schmocker-Fackel



In future, floods will occur more frequently and will be more severe. Especially with regard to mountain streams, the question is how long the underground can store the water. The relationship between precipitation volumes, storage capacity of the catchments and runoff will be examined, so that well mapped-out measures can be taken.

Background

Not all catchments react in the same way to severe precipitation. Catchments with limited storage capacities react immediately with large floods. Smaller floods occur in catchments that can store large amounts of water in the soil. However, this storage capacity can be exhausted during very intensive and lengthy precipitation and runoff suddenly increases significantly. This phenomenon could be observed during the floods of 2005 in a number of steep alpine catchments. How will these catchments react when precipitation becomes more frequent and when its volume increases due to global change?

Aims and methods

This project aims to better understand the relationship between precipitation, storage capacity of the soil and the geological underground, and runoff behaviour. The effects of the expected increase in precipitation will be of particular interest. Steep mountainous catchments that react quicker and more intensively than expected to severe precipitation will be identified and examined. Field experiments, runoff measurements of springs and maps of runoff processes will be used to modify the runoff models in such a way that they reliably describe the behaviour during severe precipitation.

Significance

Flood protection measures are complicated and expensive. For this reason, protection measures should above all be adapted or newly taken in those catchments in which increased precipitation will lead to larger floods. This project provides the required basis for decision-making.