Observation of Spatial and Temporal Variability of Snowmelt Energy Balance Factors and Runoff Sources During Rain on Snow Events

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Introduction to Rain On Snow

Rain on snow (ROS) conditions often produce snowmelt floods in regions with a seasonal snow cover. Projected climate change is leading to increased frequency in the occurrence of ROS conditions, which have a great impact on snowmelt and runoff processes. In this study, we analyze the impact of ROS on snowmelt and runoff processes in the Southern Alps, using data from the Ross variability. ROS floods were identified using a combination of air temperature, snow temperature, and precipitation data. The study was conducted at the Ross Valley Experimental Catchment (RVEC), a small Alpine catchment in Switzerland. The aim was to understand the mechanisms behind ROS floods and to develop a framework for predicting ROS floods.

Where does the energy come from?

Calculation of Snowmelt Energy Balance

The amount of energy available for snowmelt can be estimated using the energy balance approach. The energy budget includes the net radiation, the sensible heat flux, and the latent heat flux. The energy balance is balanced, and the energy available for snowmelt can be estimated. The energy available for snowmelt is determined by the balance between the energy inputs and the energy losses.

Where does the water come from?

Potential Runoff Water

Potential runoff water is the water that can potentially contribute to the runoff. It is determined by the energy balance approach and the water content of the snowpack. The energy available for snowmelt is determined by the balance between the energy inputs and the energy losses. The water content of the snowpack is determined by the snowmelt and the precipitation.

Conclusions

The results of this study show that ROS can have a significant impact on snowmelt and runoff processes. The energy balance approach is a useful tool for understanding the mechanisms behind ROS floods. The energy balance approach can be used to predict ROS floods, and the water content of the snowpack can be used to estimate the potential runoff water.

Literature cited