Geophysical Research Abstracts
Vol. 21, EGU2019-15452, 2019
EGU General Assembly 2019

Critical hydro-meteorological trigger conditions for debris flows in a changing climate

Roland Kaitna (1), Prenner David (1), Switanek Matt (2), Douglas Maraun (2), and Markus Hrachowitz (3)

(1) Institute of Mountain Risk Engineering, University of Natural Resources and Life Sciences, Vienna, Austria (roland.kaitna@boku.ac.at), (2) Wegener Center for Climate and Global Change, University of Graz, Austria, (3) Faculty of Civil Engineering and Geosciences, Delft University of Technology, The Netherlands

Debris flows are mostly triggered by long-lasting rainfall or short duration storms. In some cases, snow melt may be an additional factor. In the course of climate change, these critical hydro-meteorological conditions may become more frequent and that and by that facilitate debris flow initiation. In this study, we simulate the hydrological state of six different catchments in Austria that experienced debris flow events in the last 40+ years. To identify debris flow trigger conditions based on the simulated hydro-meteorological variables, a set of criteria was defined for each trigger type that is either long-lasting rainfall, short duration storm, snow melt or rain on snow. Additionally, we run the hydrological model with projected climate data up to year 2100 based on two different emission scenarios RCP4.5 and RCP8.5. We present changing catchment states as well as changing trigger conditions for the near future (2021-2050) and far future (2071-2100) in all six regions. Results show that winter months are getting moister while summer months are becoming drier. Mean annual critical trigger conditions slightly decrease up to -2.3% (about 14 days per year) on average over all study regions. However, there are distinct seasonal and regional shifts that show some significant increase in spring and fall.