



Assessing the spatiotemporal impact of climate change on landslide occurrence in China

Qigen Lin (1,2), Ying Wang (1), Thomas Glade (2), and Jiahui Zhang (1)

(1) Key Laboratory of Environmental Change and Natural Disaster of Ministry of Education/Academy of Disaster Reduction and Emergency Management, Faculty of Geographical Science, Beijing Normal University, 100875 Beijing, China, (2) ENGAGE – Geomorphological Systems and Risk Research, Department of Geography and Regional Research, University of Vienna, Universitätsstraße 7, 1010 Vienna, Austria

Landslides result in severe casualties every year in China. An increase in extreme precipitation in China has been found, and the areas experiencing unusually extreme precipitation are also expanding due to climate changes. This leads to a change of landslide occurrence due to climate change. We try to assess the future change of landslide occurrence in China under different climate change scenarios based on a fatal landslide event inventory with 1950 non-seismically triggered landslides, the observed daily rainfall data and the Global Daily Downscaled Projections (NEX-GDDP) dataset derived from 21 General Circulation Models (GCMs) for RCP 4.5 and RCP 8.5. Firstly, the CTRL-T algorithm is used to extract the rainfall events and their corresponding rainfall duration and cumulative event rainfall for observed precipitation data and the GCM dataset including the historical and future data. Then, the relationship between the extracted rainfall events from the observation data and the fatal landslide events is analyzed to establish the cumulative event rainfall (E) and rainfall duration (D) threshold. Appropriate GCM models are selected based on the comparison of the GCM historical rainfall event and the E-D threshold. The characteristics of past and future GCM rainfall events at locations where landslide susceptibility is above a certain value are analyzed and the frequencies are determined i.e. the possible landslide occurrence that exceeds the E-D threshold. Finally, we assess the impact of climate change on landslides in China by comparing the historical and future frequency of landslide occurrence under different climate scenarios. This research will help to better understand the future changes in landslide hazard in the context of climate change.