

An earthquake-triggered avalanche in Nepal in 2015 was exacerbated by climate variability and snowfall anomalies

Yu Zhuang^{1,2*}, Binod Dawadi^{3,4}, Jakob Steiner^{5,6}, Rajesh Kumar Dash⁷, Yves Bühler^{1,2}, Jessica Munch^{1,2}, Perry Bartelt^{1,2}

¹WSL Institute for Snow and Avalanche Research SLF, Davos Dorf, Switzerland

²Climate Change, Extremes and Natural Hazards in Alpine Regions Research Centre CERC, Davos Dorf, Switzerland

³Central Department of Hydrology and Meteorology, Tribhuvan University, Kathmandu, Nepal

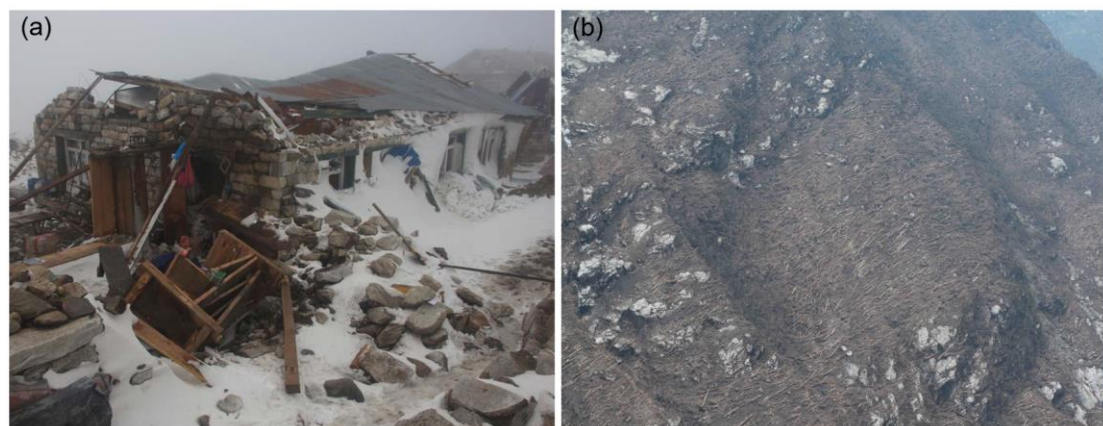
⁴Kathmandu Center for Research and Education Chinese Academy of Sciences-Tribhuvan University, Kathmandu, Nepal

⁵Himalayan University Consortium, Lalitpur, Nepal

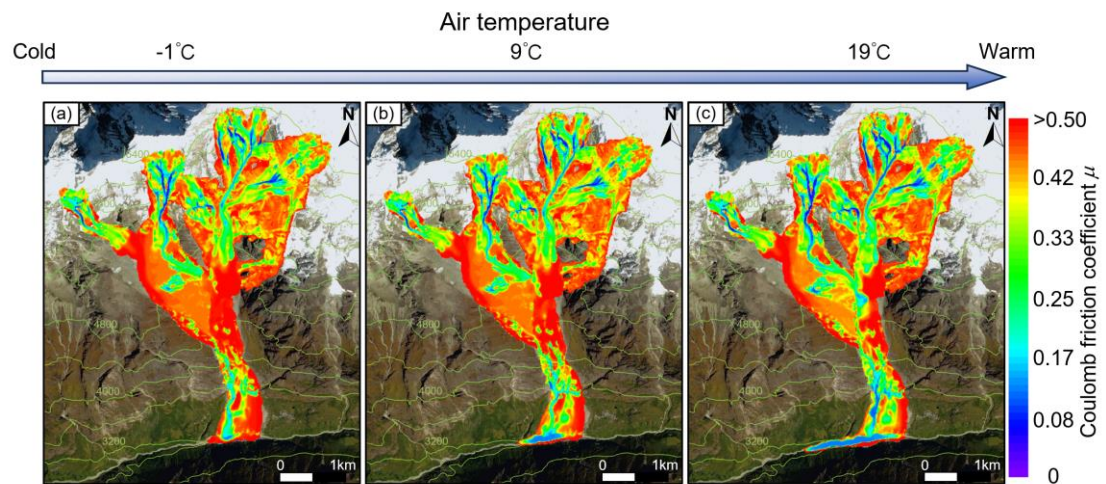
⁶Institut für Geographie und Raumforschung, University of Graz, Graz, Austria

⁷Geotechnical Engineering and Geohazards (GEGH) Group, CSIR-Central Building Research Institute, Roorkee, Uttarakhand, India

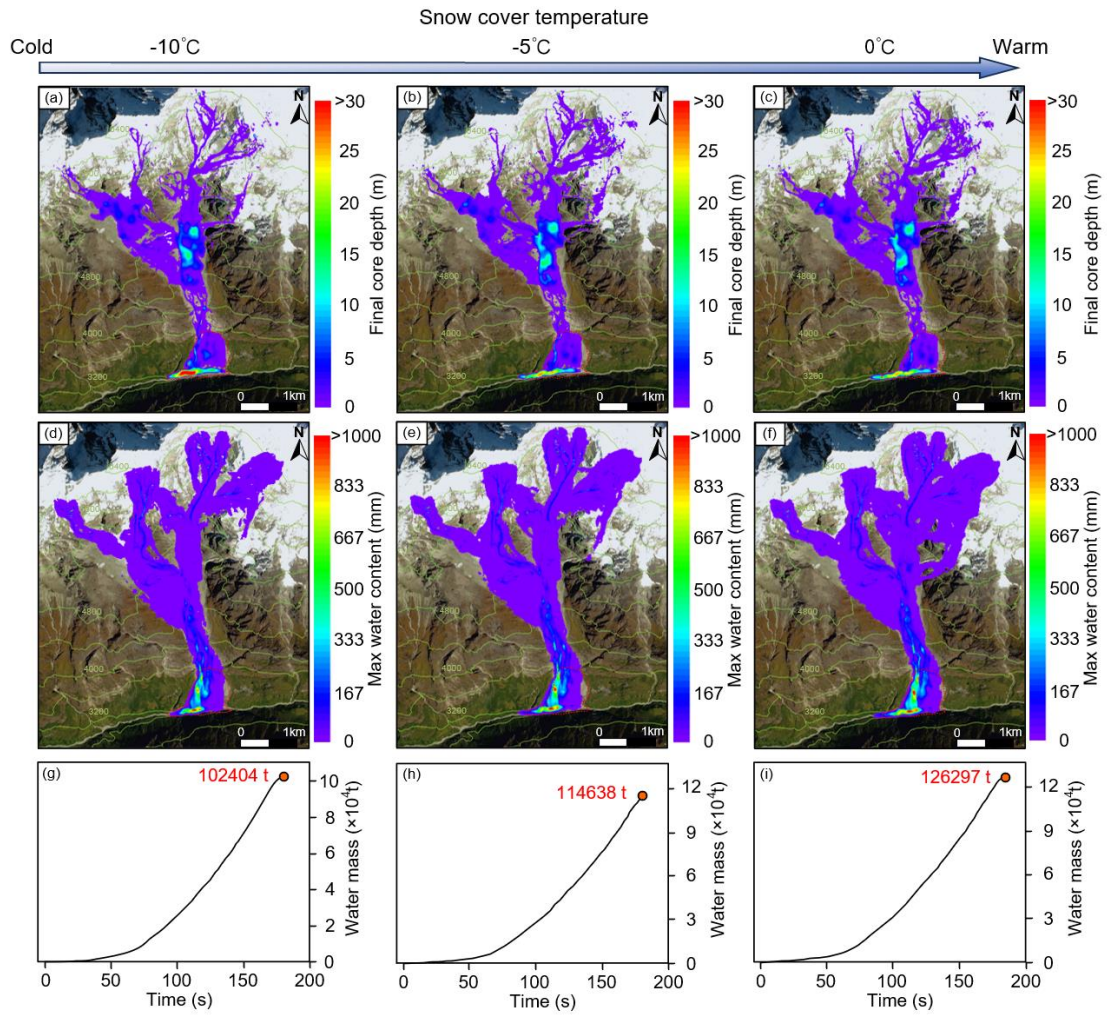
Corresponding author: Yu Zhuang (yu.zhuang@slf.ch)



Supplementary Fig. 1 Langtang avalanche-induced air blasts destroyed houses constructed of stone slabs and flattened a forest. (a) Damaged houses; (b) Air blast-induced tree breakage.



Supplementary Fig. 2 Change of Coulomb friction coefficient in different air temperature scenarios, indicating the change of rheological behavior.



Supplementary Fig. 3 Impacts of snow cover temperature on the meltwater production and avalanche runout. The snow cover temperature is -10°C, -5°C and 0°C, respectively at the release area. The input air temperature remains fixed and is the same as Fig. 2.