Geophysical Research Abstracts
Vol. 13, EGU2011-10422, 2011
EGU General Assembly 2011

Tree rings as a tool to better understand debris-flow occurrence and initiation – a case study from South Tyrol

Michelle Bollschweiler (1,2), Markus Stoffel (1,2), Marco Borga (3), Francesco Comiti (4), and Bruno Mazzorana (5)

(1) University of Berne, Laboratory of Dendrogeomorphology, Institute of Geological Sciences, Berne, Switzerland (michelle.bollschweiler@dendrolab.ch, +41 (0)31 631 48 43), (2) Climatic Change and Climate Impacts Group (C3i), Institute of Environmental Sciences, University of Geneva, 7 route de Drize, CH-1227 Carouge-Geneva, Switzerland, (3) Departments of Land and Agroforest, Environments, University of Padova, Via dell'Università 16, 35020 Legnaro, Italy, (4) Faculty of Science and Technology, Free University of Bozen-Bolzano, Via Leonardo da Vinci 7, 39100 Bolzano, Italy, (5) Department of Hydraulic Engineering, Autonomous Province of Bolzano/Bozen South Tyrol, Cesare-Battisti-Straße 23, 39100 Bolzano, Italy

Through their sudden and unpredictable occurrence, debris flows represent a major hazard in many mountainous regions of the world, especially in regions with dense population or infrastructure conflicting with debris-flow channels. Often, data on past events and their triggering conditions is sparse or completely missing. It is therefore our goal of this contribution to shed light on the link between debris-flow occurrence and meteorological triggering conditions in a case study from South Tyrol.

The debris-flow cone investigated is located in the Prags Dolomites, southwest of Lago di Braies at an elevation of 1500–1600 m asl and fed by a catchment of approximately 7.5 km2. The highest point of the catchment is the Seekofel summit (2810 m asl). Geology is dominated by dolomites and karst phenomena influence runoff in the steep catchment. Material transported during debris-flow events mainly originates from small talus cones where sediment originating from weathering and erosion processes is temporarily stored. Debris flows at the case study location are composed of matrix-poor granular material and are characterized through short transportation distances. Data on past debris-flow activity is completely missing at the site.

We therefore sampled a total of 155 trees (Picea abies (L.) Karst and Larix decidua Mill.) showing obvious signs of past debris-flow activity. Trees were mostly buried by material deposited around the stem base; however, a limited number of injuries and inclined stems were recorded as well. Oldest trees at the location are well over 300 years all. Growth disturbances in the tree-ring samples are currently being assessed so as to reconstruct past debris-flow frequency. Through precise positioning of sampled trees on the map, the spatial extent of past events will be determined as well. In a further step, we will integrate daily and sub-daily resolved precipitation data from several meteorological stations in the vicinity of the study area so as to identify the triggering precipitation event and therefore better understand hydro-meteorological factors leading to the initiation of a debris-flow event in the investigated catchment.