Geophysical Research Abstracts
Vol. 21, EGU2019-3171, 2019
EGU General Assembly 2019

The role of landslides in the development of small mountain river valleys

Joanna Caputa and Elżbieta Gorczyca

Jagiellonian University, Institute of Geography and Spatial Management, Department of Geomorphology, Kraków, Poland (asiak3003@gmail.com)

The aim of the research is to determine the role of landslides in the development of river channels and valley floors in the third-order and fourth-order river catchments (according to Horton-Strahler method). The main attention is focusedto landslides with direct contact with the river channel. Thirty river valleys were selected for research in the Polish Carpathians and they are representative of the middle mountains. The area of the studied river catchments ranges from 1.3 km^2 to 17.6 km^2.

The LIDAR model was used to analyze the morphometric parameters of the catchments and landslides. Data from aerial LIDAR scanning (regular 1x1m grid, *asc files) were obtained from the Central Office for Geodetic and Cartographic Documentation (CODGiK), Poland. The average altitude error for interpolated data does not exceed 0.2 m.

Landslides occupy 5-77% of the studied catchments' area. In total, 344 landslides have been mapped. 320 landslides having contact with the river channel or valley floor constitute 93% of all landslides in the catchments under the study. The length and the type of contact (Korup 2005) between landslides and the river channel was calculated. According to Korup classification (2005), the most common landslide slope to the river channel relation is the "point" type (66.6%), next the "area" type (21.9%) and the most rare is the "linear"type (3.4%).There is no "indirect" type in selected catchments due to the lack of water reservoirs. The most common results of such landslide to river channel relation are: undercutting the landslide body by the river and the bending of the river channel by landslides.

The greatest "landslide pressure" is characteristic to valleys where more than 45% of the total river channel length have the contact with landslides. The effects of such influence are among others: narrowing of the valley floor and formation of accumulation zones upstream the valley sections blocked by landslides.

The analysis of morphometric characteristics of the landslides having contact with river channels provides the basis for determining the role of landslides in the development of valleys of the third-order and fourth-order rivers.The keyresult of the research is the qualitative and quantitative assessment of couplings between landslides and mountain streams.