

Abstract

This thesis focuses on morphometric characteristic of debris flows and also areal and frequency changes over time in the Roháčská Valley and its tributary valleys, Western Tatra Mountains. Aerial images taken in 1973, 1986, 2003 and 2015 were used to delineate the spatial extent of debris flows transportation-accumulation zones as well as their length in each period. Changes within the whole period 1973 – 2015 were quantified and a general trend in debris flows spatial extent was outlined. Selected morphometric characteristic (e.g. elevation, slope, aspect or solar radiation) for both the initiation and deposition areas were determined for the present debris flow tracks using the digital elevation model. Field works were aimed to delineation of transportation-accumulation areas below the tree line (particular attention was given to frontal parts and lateral léves of debris flow accumulations). The degree of weathering of selected boulders (Schmidt hammer test) was determined and also the diameter of *Rhizocarpon geographicum* thali was measured.

About 98 debris flow tracks presently occur in the study area. In the periods of 1973 – 1986 and 2003 – 2015 decrease of debris flows transportation-depositional zones was observed, unlike the period of 1986 – 2003 when slight increase of debris flows transportational-accumulation areas occurred. Using morphometric analysis the mean altitude and slope of debris flow source areas was determined (1923 m a.s.l. and 43,8° respectively) as well as mean altitude and slope of debris flows transportation-accumulation areas (1778 m a.s.l. and 35,7° respectively). Mean R-values of selected boulders ranges between $32,7 \pm 6,8$ and $65,0 \pm 3,8$ and determine the group of debris flows that occurred before and after 1973. The age of selected debris flows (12 – 63 years) was derived using lichenometry. The detected periods in most cases coincide with the heavy rainfall events when the rainfall thresholds for debris flow initiation was exceeded.

Keywords: debris flow, aerial image, morphometric characteristic, Schmidt hammer test, lichenometry, Western Tatra Mountains