Abstract

The presented thesis deals with catchments of the alpine lakes in the High Tatra Mountains. The lakes were subject of a long-term monitoring to detect changes of chemical and biotic composition of lake water induced by acid atmospheric deposition and by its decline. The studied processes required a quantitative approach to describe the characteristics of the catchments. The definition of new catchment parameters or the refining estimated parameters was not allowed without current technical and computing equipment because of the complexity of mountainous terrain.

The morphological parameters for 26 catchments were obtained by analysis of the created digital elevation model (DEM) using tools of geographic information system (GIS, software ESRI ArcGIS 10.2). The land cover was detected by Google aerial map (2014). The links between chemical composition ($NO3^{-}$, $\Sigma(Ca^{2+}+Mg^{2+})$) and catchment properties based on the specified or refined catchment parameters (slope, portion of an area with a slope <26 ° in the catchment, proportion of different land cover types to the real catchment area) were analysed between the years 1993 and 2012 (respectively 2006).

New morphological parameters were derived for the defined catchments. The catchments on the northern and the southern slope were distinguished by differences in the median altitude, proportion of aspect and proportion of land cover type. The declination of lake water nitrate concentration was more pronounced in rock or moraine-rock type of catchment and with lowering proportion of meadow and dwarf pine in catchment. The changes in $\Sigma(Ca^{2+}+Mg^{2+})$ correlated positively with increasing average slope.

Knowledge of the real catchment area and of the vegetation structure representation in the catchment would be helpful to make better estimation of difficult measurable catchment properties, e.g. soil pool. Parameterization of the catchments allows their use as model sites for possible study of other anthropogenic impact.