



Soil water erosion processes in mountain forest catchment – analysis by using terrestrial laser scanning

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The paper presents the results of the analysis of the water erosion processes of soil occurring in forestry mountain catchment area in the region of West Sudetes Mountain in Poland. The research was carried out within the experimental area of skid trails (operational trails), which were used to the end of 2010 in obtaining wood and its mechanical transport to the place of storage. As a consequence of forestry works that were carried out it was changing the natural structure of ground and its surface on the wooded slopes, which, combined with the favorable hydro-meteorological conditions contributed to the intensification of the water erosion processes of soil on surface of trails.

For the implementation of the research project of the analysis of water erosion processes in the forestry catchment area innovative was used terrestrial laser scanning. Using terrestrial laser scanning has enabled the analysis of the dynamics of erosion processes both in time, as well as in spatial and quantitative terms. Scanning was performed at a resolution of 4 mm, resulting in 62 500 points per 1 square meter. After filtering the data were interpolated to other resolution of 1 cm, which can identify even the smallest linear and surface effects of erosion. While installed on the experimental area, along the skid trails, anti-erosion barriers in order to reduce transport eroded material and allow its accumulation. Allowed to precisely determine the location of areas of accumulation, the rate and amount of accumulated material. The result of the analyses that was carried out is identification areas of denudation of the eroded material, and also determine the intensity of the erosion processes and their quantitative analysis.

The long-term researches on hydrological conditions and forest complexes functioning show that forest effectively stores water, limits linear and surface flow and delays water outflow from a catchment. Carried out a research project using the terrestrial laser scanning shows that anthropogenic activities in the form of forest management and their effects in the form of dense network of forest roads and skid trails and obtaining wood diminish correct functioning of a forest or even increase the phenomenon of erosion. Submit the results of the analysis consider the problem of dynamics and intensity of erosion processes in mountain areas, and show the effectiveness of the methodology of research.