Summary

The following dissertation describes the application of the dendrochronological method for detecting active landslide slopes and the method of developing landslide hazard maps over larger areas – entire mountain massifs. The material was collected from three study sites: the massif of Sucha Mt in the Beskid Żywiecki Mts, the Garbatka landslide, and the creeping slopes of Kopica Mt in the Kamienne Mts. All sites are covered with commercial forests – Norway spruce monocultures (*Picea abies*). The main method used in the doctoral dissertation was the dendrochronological method, based on the analysis of tree rings in the stems of trees tilted and bent due to mass movements. Landslides and soil creep were dated using tree-ring eccentricity and compression wood with annual resolution. The obtained results of dendrochronological dating were the basis for further geoinformatics and statistical analyses: the average frequency of landslide events was calculated at sampling sites, which was then interpolated to landslide activity and landslide hazard maps for the studied mountain massif.

The study results were presented in the form of three thematically consistent scientific articles published in indexed journals included in the Ministry of Education and Science's list of journals and the Thomson Scientific Master Journal list. The studies carried out as part of the doctoral dissertation focused on comparing patterns of eccentricity and compression wood developed by common spruce trees under the impact of soil creep and landslides, and determining the differences in the development of the two features of wood anatomy under the impact of the two different processes. A comparison of the results of dating eccentricity and compression wood showed that growth eccentricity alone allowed the detection of a greater number and frequency of landslide events compared to compression wood, but the most advantageous in dating mass movements is the combined use of both growth disturbances.

The PhD thesis also presents the application of dendrochronological dating results to develope landslide activity maps in several variants, using different features of common spruce wood anatomy and different data interpolation methods. Comparison of the maps made allowed the development of a method of combining dendrochronological and geoinformatics tools most effective from the point of view of presenting the spatial variability of landslide hazard. The most suitable method for interpolating dendrochronological data in the studied mountain massif is the Spline method with superimposed barriers in the form of watercourses and ridgelines. The method used, combined with the results of dendrochronological dating, allowed the development of a landslide hazard map that provided information on the actual spatial differences in landslide hazard resulting from the analysis of landslide activity over the past few decades. Such maps provide more accurate data on overall landslide hazard, compared to maps based on landslide susceptibility. Therefore, landslide hazard maps developed using dendrochronological data can find practical use in spatial and urban planning and can provide a basis for landslide risk assessment.