

The aim of this study has been to analyse the spatial-temporal dynamics of the treeline ecotone formed by Norway spruce (*Picea abies*) as the dominant conifer in the Hruby Jeseník Mountains since the mid 20th century until the present in order to compare vertically connected sections of the timberline ecotone.

Three features have been examined within the spatial and temporal context – the age structure, the spatial structure and the age/diameter growth. Dendrochronological methods have been employed to estimate the age structure. Moreover, the remote sensing and the GIS method have been used to detect the changes of the Norway spruce cover using the archive and actual aerial orthophotographs through their vectorisation and classification incorporating both spectral and spatial information as well as the knowledge base classification technique. The comparative analysis of the archive and actual orthophotographs has allowed to evaluate the spatial-temporal changes in the cover. The age and diameter growth relation has been established using the non-linear regression.

It is established that the changes in the age and spatial structure are synchronous at all localities with a similar altitude. The younger age trees proportion is increasing with the growing altitude and the changes of the cover are largest in the closed-canopy forest. A potential favourable slope aspect has not been reflected in connection to the changes of the cover. It has been partly reflected on the age structure changes at the highest located tree groups, however, it has not been detected in the closed-canopy forest. It has been further found that there was an increase in the age structure and cover dynamics that occurred in the 1940s and the 1960s at all sites as a result of increased average temperatures in the growing season. On the other hand, the decrease by the 1980s was a consequence of a simultaneous influence of decreasing temperatures and the air pollution.