



Temporal and Spatial Dynamics of Tree Species Composition in Temperate Mountains of South Korea

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Long term studies on vegetation dynamics are important to identify changes of ecosystem-level responses to climate change. To learn how tree species composition and stand structure change across temperate mountains, the temporal and spatial variations in tree species diversity and structure were investigated using the species composition and DBH size collected over the fourteen-year period across 134 sites in Jiri and Baekoon Mountains, South Korea. The overall temporal changes over fourteen years showed significant increase in stand density, species diversity and evenness according to the indices of Shannon-Weiner diversity, Bray-Curtis dissimilarity, and Pielou's evenness, contributing to the increase of basal area and biomass growth. The change of tree species composition could be categorized into five species communities, representing gradual increase or decrease, establishment, extinction, fluctuation of species population. However, in general, the change in species composition appeared to have consistent and directional patterns of increase in the annual rate of change in the mean species traits including species richness, pole growth rate, adult growth rate, and adult stature with five common dominant species (*Quercus mongolica*, *Quercus variabilis*, *Quercus serrata*, *Carpinus laxiflora*, and *Styrax japonicus*). The spatial patterns of species composition appeared to have a higher stand density and species diversity along with the low latitude and high slope ecosystem. The climate change was another main driver to vary the distribution of species abundance. Overall, both temporal and spatial changes of composition in tree species community was clear and further analysis to clarify the reasons for such fast and species-specific changes is underway especially to separate the effect of successional change and climate change.

Keywords

species composition; climate change; temporal and spatial variation ; forest structure; temperate forest