Geophysical Research Abstracts
Vol. 19, EGU2017-11395-1, 2017
EGU General Assembly 2017

Long-term changes of tree species composition and distribution in Korean mountain forests

Boknam Lee (1), Hoontaek Lee (2), Sunhee Cho (3), Jongguk Yoon (3), Jongyoung Park (3), Hyun Seok Kim (2,4,5)

(1) Research Institute of Agriculture and Life Sciences, Seoul National University, Seoul, Republic of Korea, (2) Department of Forest Sciences, Seoul National University, Seoul, Republic of Korea, (3) Seoul National University Forest, Seoul National University, Seoul, Republic of Korea, (4) National Center for AgroMeteorology, Seoul National University, Seoul, Republic of Korea, (5) Interdisciplinary Program in Agricultural and Forest Meteorology, Seoul National University, Seoul, Republic of Korea

Long-term changes in the abundance and distribution of tree species in the temperate forests of South Korea remain poorly understood. We investigated how tree species composition and stand distribution change across temperate mountainous forests using the species composition and DBH size collected over the past 15 years (1998-2012) across 130 permanent forest plots of 0.1 ha in Jiri and Baegun mountains in South Korea. The overall net change of tree communities over the years showed positive in terms of stand density, richness, diversity, and evenness. At the species level, the change of relative species composition has been led by intermediate and shade-tolerant species, such as Quercus mongolica, Carpinus laxiflora, Quercus serrate, Quercus variabilis, Styrax japonicus, Lindera erythrocarpa, and Pinus densiflora and was categorized into five species communities, representing gradual increase or decrease, establishment, extinction, fluctuation of species population. At the community level, 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 density, pole growth rate, adult growth rate, and adult stature. Based on the additive models, the distribution of species diversity was significantly related to topographical variables including elevation, latitude, longitude, slope, topographic wetness index, and curvature where elevation was the most significant driver, followed by latitude and longitude. However, the change in distribution of species diversity was only significantly influenced by latitude and longitude. This is the first study to reveal the long-term dynamics of change in tree species composition and distribution, which are important to broaden our understanding of temperate mountainous forest ecosystem in South Korea.