

Allocation of forest net primary production varies by forest age and air temperature

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Carbon partition among plant parts has a vital influence not only on the growth of individual plants but also on decomposition, carbon and nitrogen sequestration, and plant-atmosphere water exchange. Although many studies have tried to reveal plant growth mechanisms using observational living biomass or the biomass ratio among different organs, knowledge and understanding about carbon partition is still scarce and exists much uncertainty. In this work, a dataset from the Chinese Ecosystem Research Network (CERN) was used to explore the dependences of net primary production (NPP) partition among foliage, stem and branch, and root on forest age, and mean annual temperature (MAT). The results found that (1) younger plants usually allocated a higher proportion of the NPP to stems, branches, and roots; (2) MAT was negatively correlated with the proportions of the NPP allocated to foliage (F_{leaf} ; %) and roots (F_{root} ; %), while proportions of the NPP allocated to stems and branches (F_{stbr} ; %) were positively dependent on MAT; (3) forest age had a larger direct influence on F_{leaf} and F_{root} , while MAT was relatively important for F_{stbr} . This work not only is important for understanding the contribution of climatic factor and forest age on forest NPP partition, but also provides valuable ideas for developing ecological models.

Keywords: net primary production partition, forest age, climate, China's forest