



Linking material cycles and ecosystem services assessment in forest modelling

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In ecosystem services assessment in South Korea, many studies have applied various modelling methods. However, these modelling approaches mainly focused on the statistical growth model based on the national forest inventory, so calculating carbon was the main target of research. Statistical modelling enables annual assessment of the carbon budget in forests, but it was limited to understanding daily ecosystem changes and other material cycles. Therefore, this study tried to set up the linkage of material cycles and ecosystem services using various current modelling schemes in South Korea. Therefore, the process-based model and current forest models were applied to assess carbon and ecosystem productivity. In addition, their possible linkage to ecosystem services was analyzed. From the process-based model, the net primary productivity value was calculated at around 5.17 Mg C ha⁻¹ average, and it indicated around 1.61 Mg C ha⁻¹ in net carbon sequestration during the 2021-2100. Considering the current projection of annual carbon sequestration, this value is similar to the current model projection. In addition, the process-based model calculated evapotranspiration, respirations, and other values which converted ecosystem services, especially climate regulation, supporting ecosystem services, and provisioning ecological materials. Linkage of these models can support to assessment of many other non-assessed ecosystem services, and an ensemble of modelling and expanded modelling in ecosystem services will be required to assess Korean ecosystem services.