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[\[PDF \(519K\)\]](#) [\[References\]](#)**Biogeochemical model in forest ecosystem; Application and problem of PnET model**[Hideaki SHIBATA](#)¹⁾, [Nobuhito OHTE](#)²⁾, [Fuyuki SATOH](#)¹⁾ and [Takahito YOSHIOKA](#)³⁾

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Abstract

Biogeochemical processes are closely related to ecosystem functioning and the change in stream chemistry against various environmental changes. A process-based model that replicates the interaction between biotic and abiotic factors is a powerful research tool in improving our understanding the environmental drivers of temporal and spatial fluctuations in biogeochemical cycling and predicting future changes in ecosystem functioning. In this paper, we review the general concepts, structure and applications of the existing process-based model, FOREST-BGC, CENTURY, TEM and PnET. We applied the PnET-CN model in a natural forest watershed in northern Hokkaido, Japan to assess the performance of the model and the problems encountered in improving its application. The PnET model is a generalized, lumped model based on the physiological processes of photosynthesis and evapotranspiration. Predicted seasonality in stream nitrate concentrations using the PnET-CN model was in general agreement with the observed values in Uryu Experimental Forest, Hokkaido University, despite a minor over-prediction during the winter and under-prediction in the non-snowy period. Analysis of the model's structure and validation suggested the need for modifications, including (i) the accumulation and melting process of atmospheric nitrogen deposition in the snowpack, and (ii) the effect of hydrological processes on the ground.

Key Words: [nutrient cycling](#), [stream chemistry](#), [simulation model](#), [process-based model](#),
[carbon and nitrogen dynamics](#)



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